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FOLK MEDICINE IN NEW HAMPSHIRE*

HAROLD D. LEVINE, M.D.†

BRISTOL, NEW HAMPSHIRE

IN the small towns and villages and in the countryside of New Hampshire there still exists a vast heritage of medical folklore, most of which stems from the practices of the original English settlers and their Indian neighbors. Even in the minds of the "old folks" this storehouse of "simples, bitters and specifics," of medical superstition and voodoo, is all too vague. And the younger people know still less about the subject. The need for these homely remedies arose, of course, from the inaccessibility of medical care to the farmers, woodsmen and laborers living in remote country districts. But the advent of the country doctor, the increased use of the radio, newspapers and magazines, the founding of reading clubs, the automobile and the construction of more and better roads have made their further use unnecessary. Unless recorded now, all knowledge of this fascinating subject and interest in it may well be lost forever.

The country doctor, unlike the physician practicing in large cities, who treats a presumably more enlightened and sophisticated group, is in a peculiarly fortunate position to observe and record these traditional practices. I have undertaken to describe how the people of New Hampshire, particularly in the central portion, have treated and, to some extent, continue to treat disease at home. I have obtained most of the material directly from them, and many of the quoted passages are verbatim accounts of what they have said.

It is hoped and urged that country doctors practicing in others parts of our country make similar observations and thus help to preserve that body of our national culture called Americana.

RESPIRATORY INFECTIONS

Obviously these people were interested in treatment, not in diagnosis. They knew what their symptoms were, and they wanted relief from them. If the patient had a sore throat it did not matter to him whether he had diphtheria, septic sore throat or just plain sore throat. What he wanted was relief.

Considerable merit was attributed to a gargle made by steeping equal parts of elm bark, white-oak bark, sumac berries and blackberry root. Many preferred a gargle containing a mixture of brake root and whisky. Others acclaimed the virtues of kerosene, either "outwardly" or "inwardly" or both; that is, it might be rubbed on the outside of the neck or swished about in the throat. Gold beads or a gold chain worn around the neck still has vogue in the prevention and treatment of sore throat — and is also said to be useful as a prophylactic against and treatment for goiter. A dirty or used dark stocking worn around the neck served as a moral if not physical deterrent against colds "going down into the chest." An alternative method still widely used is to bind to the neck at bedtime a red flannel bandage with thinly sliced salt pork and thinly sliced onions, the whole sprinkled with black pepper.

Closely related to sore throat was so-called "canker." This apparently meant any membrane in the buccopharyngeal cavity, no matter what its cause. For this condition an infusion of gold-thread was used as a mouth wash. The use of this herb was known to the Indians.[1] Brake root or sage tea was similarly used. Amber beads were worn to prevent croup; Castanea (chestnuts), dried bumblebees in molasses or just plain urine was used to cure croup. Sugar added to moss obtained from the north side of a maple tree was regarded as an excellent cough sirup. So were a sirup made of yarrow or of red clover and a drink made of elecampane (sunflower). Red clover was supposed to be especially effective in whooping cough. A concoction called "Rob" and containing elderberries enjoyed wide use in this region. Fifty years ago, many people in the neighborhood gathered herbs for the Shakers of Canterbury. One

*Read before the Merrimack (New Hampshire) County and Center District Medical Society on July 10, 1940.

†Librarian of staff, Franklin Hospital.

Thomas Corbett, "a properly trained physician," joined them and made a cherry pectoral. His name is on the label of the old blown bottles of Canterbury sarsaparilla.[2]

For "colds" in general there was the familiar catnip tea or that made from dried elder blossoms and peppermint leaves, but the most spectacular medicine was hard cider with cayenne pepper *à la* red-hot poker. "Men folks used to take hard cider, heat a poker red hot, while heating sprinkle the cider with cayenne pepper, then run the red-hot poker plumb into the mug of cider, causing it to boil and foam. This was drunk down as soon as the poker was taken out."

The herb, thoroughwort, is also called "boneset," a name derived from its use in the severe form of influenza called "break-bone fever." Elder-flower tea was considered infallible in the early stages of influenza. If it did not work, "you just weren't early enough in using it."

With regard to tuberculosis, the following story, which appeared in the July, 1939, issue of the magazine, *Yankee,* is of interest.

> "You must be Ned's boy," an old man said to me once. "I knew your father. Yes, I knew your great-grandfather and all his family, and I'm going to tell you something that will surprise you.
>
> "You probably don't know it, but if a family is dying off of consumption, the disease goes no farther after one of the members of the family has been buried face down.
>
> "I was at the funeral of your great-uncle John. He died of old-fashioned consumption just as other members of the family before him. I was one of several who made up our minds to stop the run of consumption in that family, so we stayed in the cemetery until the relatives had gone, then we lifted the casket from the open grave and turned it over. So your great-uncle John was buried face down, and it ended consumption in that family."

In my opinion the following story from New Hampton is even better. The two daughters of a prominent farmer, Marshall Bowen, both contracted consumption. They tried everything known at the time, and finally went to the village witch, who told them that one girl was past saving, but that when she died, they should cut her heart out and bury it by Dickerman Brook. This would prevent the death of the other daughter. Tradition is vague as to whether this dictum was followed, but the other girl died of the same disease.

In the treatment of any lung disease — from a simple "cold in the chest" to pneumonia — it was and is still considered essential that the patient be well greased. And the favorite remedy for this purpose is skunk's oil, although Vick's Vapo-Rub is now running a "strong" second. No amount of arguing will convince these people that these greases only make the patient messy, smelly and uncomfortable: "Why any fool knows that the greases strike right into the lungs and make the cough looser."

Skunk oil is obtained by catching a skunk in the fall, when it is "nice and fat." It is carefully dressed, particular care being taken not to disturb the scent gland. After skinning and removal of the viscera and scent gland, the carcass is slowly baked in an oven so that the fats are not burned. The oil cooks out and is caught in a vessel. It is sometimes taken internally as well as externally. Although skunk oil is widely used in the Bristol region, the folks around Wolfeboro prefer to use a baked-bean poultice, and in the Franklin neighborhood the flap-jack poultice is popular.

Cardiovascular Diseases

Pipsissewa had a particular vogue in the treatment of heart disease. This beautiful plant, also known as "heart's ease" and brought over from England, was used to heal disease of the heart as well as the "broken heart." And garlic was eaten for its reputed effect of preventing high blood pressure and hardening of the arteries.

The following "Old Woman's Sure Cure for Dropsy" is handed down from old Dr. Stillings of Concord: "Take a little garden selendine, a little pipsissewa, a little gill [ivy] run over the ground, green of alder and white of hen dung. Slowly simmered over a slow fire and taken in copious draughts, this will produce such slushes of water and slugs of turd as ever your eyes have beheld."

Fever and the "Water Cure"

Standard treatment for fever was the use of sage or catnip tea, tea of pink or white yarrow, or compound spirits of lavender and ether. I have sometimes had trouble getting patients to take water when they had a fever. This is possibly the effect of the old adage, "Stuff a cold and starve a fever." I once had occasion to advise a ninety-year-old codger with urinary infection to drink plenty of water. As I was driving off I could hear him protesting to his daughter: "I know his kind. He's one of them goddam cold-water doctors!" Interestingly enough, I later learned that a cult of "water doctors" had practiced in the region. The so-called "water cure," a "method of treating infirmity and disease," was introduced in Concord by Dr. Timothy Haynes about 1850. He enjoyed a good practice for a time but disposed of his "institute" to Dr. William T. Vail, who ran it for three years and then in 1855 moved to Franklin

and soon after to Hill, where the institution had its remaining life.[3]

Speaking of the water cure, the following story may be of interest. A family of Robinsons lived on the old mountain road to North Sanbornton. One of the children developed rickets, whereupon some rustic sage told the mother that the way to cure the child was to take him down to Palmer Spring in the vicinity, and to dip him in the water nine times. The baby survived the ducking and the rickets.

Nosebleeds

To prevent nosebleed a piece of red woolen yarn or a piece of nutmeg strung through two holes was worn around the neck. For children, bloodroot was hung over the foot of the bed. If the preventive measures did not work or if the patient failed to take them, nosebleed could be treated with fresh blossoms of red trillium held to the nose. For bleeding in general and nosebleeds in particular, cobwebs were widely used. The fine powder obtained from the puff-ball mushroom after it had gone to seed was reputedly an excellent quencher of blood.

A patient from Franklin confidently states that she knew someone who took red clover for a "fibroid tumor"; under that treatment the "fibroid tumor became benign."

Gastrointestinal Diseases

For "stomach trouble" the people along the Pemigewasset River used to gather bloodroot on Sumner Island. For "heartburn, dyspepsia or indigestion" they used to "chew one teaspoonful of whole white mustard seed followed with a glass of water." Sassafras, camomile, wormwood and burdock teas were also used for stomach disorders. But hearken to this sound bit of advice on "dyspepsy" from *The Family Doctor or Guide to Health* (Boston: H. B. Skinner, 1844) lent me by the beloved octogenarian Jewell sisters, of Hebron, "Abstain from medicine and live upon a sixpence a day, and earn it; or rise with the sun, saw wood for half an hour, and breakfast upon a crust of bread."

Lobelia ("puke weed") was used to make one vomit and thus "clear off the liver." This explains why the recent attempt to revive the use of this herb — in the form of lobeline sulfate — to cure the smoking habit was so unpopular. "Turkey-dung bitters, warmed," were used for the "jaunders." The people around New London preferred ironwood bark in the treatment of jaundice. The leaves and flowers of liverwort (hepatica), so called from the resemblance of its leaves to the lobes of the liver, were used as a milder remedy for disorders of the liver. This use of vegetable medicines by reason of their real or fancied resemblance to the disorder or the part affected, the so-called "doctrine of signatures," was firmly believed in by the Indians and the old English herbalists. The idea was that, by the mercy of God, many of the herbs made for the service of mankind were stamped with their characters, so that they could be read at a glance. Thus a plant with a wormlike stem was used as a vermifuge, and one with hairlike processes was used in the treatment of baldness.

In this region if anyone says he is "sick," it means that he is nauseated. Another term for nausea was "turn sickness." This usage harks back to the English ancestry of these people. I am told that in England the word "sick" is never used to indicate the state of being "ill" or "unwell." Their English origin probably also explains the fact that many of the natives, particularly those living away from the towns, address physicians as "Mister" rather than "Doctor." At first this apparent lack of respect annoyed me, but it was later pointed out that in addressing me as "Mister" their intention was to pay me the highest compliment of which they were capable. In England, of course, the regular practitioner is referred to as "Doctor," and the surgeon or superphysician is called "Mister."

Spearmint was regarded as specific for the treatment of nausea. For constipation, rhubarb and senna were used. But it is not so well known that warm thoroughwort tea and a medicine made from the inner bark of the oil-nut (butternut) tree were similarly used.[4] The bark of some tree imported from Peru was supposed to have a laxative effect when stripped downward, but an emetic effect if stripped upward!

Perhaps the most widely used remedy for the "disentary" (diarrhea, "intestinal flu," "the runs" or "the trots") was blackberry root. But the astringent properties of the steepleroot bush, "hard tack" (leaves, roots and flowers), strawberry blossoms, sweet-fern leaves and oak bark were put to similar use. Smartweed was regarded as especially good for "summer complaint." The following "cure for the disentary" is taken from the account book (1828) of Henry Hilton Chandler, of Hanover, through the courtesy of his great-granddaughter: "Take one quart of hardwood ashes and one-half gill of hardsoot from the back of the chimney. Put to three quarts of hot water. Take from one half to a wine-glassful two, three or four times per day." And finally I have it on good authority that green apples were also used

for diarrhea — not a far cry from the present-day, apple-pulp diet.

Exanthematous Diseases

To ward off contagious diseases a camphor bag was worn around the neck. This was regarded as particularly effective against scarlet fever and measles. Braided flax prevented scarlet fever and mumps. It was believed, and the belief is still widely held, that once one has contracted an exanthematous disease — in its pre-eruptive stage — the "rash must come out" and "the quicker it comes out the better"; otherwise it would "strike in," and no end of dire consequences would ensue. Housewives still boast of the remarkable ends they go to in order to "bring out" the measles rash. The sovereign measures to ensure this favorable turn of events were the drinking of hard cider, of snake-root and saffron tea or of the celebrated "nanny-goat tea." It is easy to understand how the vasodilatory effect of cider might make a measles rash more obvious. "Nanny-goat tea" or "lamb tea" or "nanny-pill tea" is simply a brew of sheep's droppings. It is not clear to me why this heroic remedy was not also used to "clear off the liver." The exact method of bringing out a measles rash seems to vary in different parts of the country. In writing of the poor whites in Florida in *The Yearling*, Miss Rawlings has Ma Baxter give Jody a mullein tea for that purpose.

Mumps "were" kept from "going down" by tying several strands of flax around a girl's neck or a boy's waist. Note that I said "mumps were" not "mumps was." In this region mumps, measles, pulse and so forth are all considered plural. There are even some who call mumps on one side a "mump."

Urinary "Stoppage"

A newborn infant delivered a few years ago in Groton was alleged by its mother not to have urinated for over twenty-four hours. She put a small bag of salt over the lower abdomen of the child and urinary function was promptly established. Shall we credit this mother, who had never heard of Pfeiffer or his work, with an uncanny ability to employ osmotic forces? "Punkinseed tea" is also used for failure to urinate.

Cure of an "Infirmity"

A child in the Mailbox Hill district of New Hampton was born with a "fissure" — where I do not know. An old man told the parents how to cure it. They were to go out to the wood lot and split an ash sapling near a brook so that the gap ran from north to south and so that the baby could be passed through the tree. This they did, and the child gradually outgrew his "infirmity." The tree is still standing.

"Spring Tonic"

A rapidly disappearing old New England institution is the well-known spring tonic or general "toner up" of the system, a real event in the family life. In the spring the mind of the housewife turned to simples and bitters to be ready with "relief and benefit" for all who might need them. From the neatly bagged and labeled herbs hanging from the cross braces of her attic or shed, she would select the appropriate ones to make her favorite spring tonic. This varied somewhat in form but never in its qualities of bitterness and woe. The tonic ranged from sulfur and molasses, sage and India molasses, rhubarb and dandelions, through pipsissewa, wormwood with or without vinegar, thoroughwort, flowers of elder, poplar bark mixed with burdock and aloes to bloodroot. Adults preferred their own tonics sweeter and were not averse to their containing spirits in varying proportions. Dandelion wine was the prime favorite.

The following "blood medicine" was used as a "spring purifier":

¼ lb. Burdock root	¼ lb. Spikenard root
¼ lb. Sarsaparilla root	¼ lb. Red-clover blossoms
¼ lb. Yellow root	1 handful Hops
¼ lb. Dandelion root	

These were stewed in 4 quarts of water until all the strength was extracted; then strained, with enough sugar added to taste, and stewed down to a sirup, when a half pint of brandy finished it off and made it ready for a tablespoonful dose three times a day.[5]

Rheumatism

Rheumatism was prevented by always carrying a horse-chestnut in the pocket, the efficacy of this device being satisfactorily proved by the fact that, after a few years of constant transportation, the chestnut became hard and dark from the absorption of the "rheumatic germs," which would otherwise have attacked the transporter. An alternative was to carry in the pocket the bone from a raccoon's penis.

For the relief of "rheumatic" joint pains a tea of the leaves of Canada thistle was drunk. For joint pains or sprains lard was heated in a skillet and a cupful of oats was added. When the oats began to pop out, the lard was applied locally as hot as could be borne. A poultice of mullein leaves boiled in vinegar was used for sprained

ankles. Catnip also relieved painful swelling, when applied in the form of a poultice. One old recipe book says "common ground worms simmered in lard is very effective in relaxing sinews that have been drawn up by disease or accident." And one man treats cramps in his legs by turning his shoes upside down under the bed.

Eyes, Ears, "Muming," Teething and Worms

For "weak" eyes, gold earrings were worn. A tea of dried rose petals was used to bathe sore eyes, and rose water is still an important constituent of many of our present-day eye washes. For sore eyes in infants, warm breast milk was milked directly from the mother into the baby's eyes. From New Boston comes a report of the use of urine for inflamed eyes.

There were several well-known treatments for earache. One was to blow tobacco smoke into the offending ear. Another was to spit tobacco juice into it. A third was to instill warm pickerel juice into the ear canal. This juice is obtained by skinning a pickerel and hanging it in the window where the sun can get at it. The heat of the sun melts the layer of fat along its back, the fat draining into a bottle under the suspended fish. This oil is warmed before using. A hot baked potato or the roasted heart of an onion held against the ear was also considered valuable.

Food for children too young to chew was chewed by some fond parent or relative and then given to the baby. This was known as "muming."

In some families, children always wore a string of Job's tears around their necks during the teething period, these round seeds of an East Indian grass being famed as preventives of fever at this troublesome time. In Alexandria five years ago I noticed a child wearing a white strap around his shoulders crossing in the front and back of his chest, in figure-of-eight fashion. His mother explained that this was a "teething jacket." That was the only time I ever happened to see one, but an Indiana colleague tells me that the practice is quite common in the Middle West.

Every time a child was ill, but especially if he ground his teeth at night, he was considered to be suffering from "worms" — unless proved otherwise. And often he would promptly receive a dose of beef gall. A tansy bag was hung around his neck to "prevent the worms from coming up into his throat and choking him to death." A much-boasted treatment for tapeworm infestation was to starve the patient, and incidentally the worms, for three or four days. Then a bowl of steaming hot soup was held at the patient's mouth. The worms, getting the odor of food, would come up and could be caught. It is not clear to me why this did not choke the patient to death. Punkinseed tea was also used for tapeworms.

Skin Troubles, Warts and Chilblains

Among the remedies for the various skin diseases were sulfur and rum for boils, gunpowder in water or the "sweat" from a heated axe for ringworm, Elder Hook's — he lived in Loudon — balm for "running sore," yellow dock boiled in vinegar for athlete's foot and balm of Gilead buds fried in mutton tallow for bedsores. Wounds from rusty nails, were and still are, bound snugly with a thick slice of salt pork, which allegedly "draws like a plaster." White-pine pitch or human urine was used for cuts and wounds. For poisoning due to snakebite, snake-root was frequently used. A squash poultice was "laid on" for the bite of the water moccasin, whereas the cut surface of an onion was applied for the bite of the rattlesnake. The fact that in time the cut surface turned black was ample proof that the poison had "come out." Butter and flour is still the quick relief for ordinary burns, but around Andover a "fresh cow dressing was long used for surface burns."

Woodsmen in this region are reputed to have eaten the leaves of poison ivy in the spring of the year to prevent ivy poisoning. This practice was said to have no injurious effect on the mucous membranes of the mouth or gastrointestinal tract, yet to produce a seasonal immunity of the skin to the poison. For victims of this weed, selendine or sweet fern was rubbed on.

For warts, mystic incantations and general hocus pocus were apparently much more effective than herbs.[6] Many of the methods have a familiar ring. "Rub the wart with a bean and throw the bean away; rub the wart with salt pork and bury the salt pork; rub the wart with a used dishcloth and hide the cloth; tie it around with a string and bury the string." There is a lady in Lakeport who, out of the goodness of her heart, will buy your wart. She gives you a penny, you bury the penny, and, "presto-chango," the wart is gone. But one old-timer said, "They warn't nawthin better fer warts 'n t' rub 'em with selendine." Mike Ackerman, of Alexandria, had a method all his own. "He didn't even need to see his patient. He had only to know that someone had a wart. He then simply went into some sort of consultation with a hobgoblin or a brownie or the devil or something, and shortly thereafter the wart was cured. He cured Will Price of his wart while Will was way down in Massachusetts in the Melrose Hospital and Mike himself was still in Alexandria. He also cured Will's nurse of her warts at the same time."

To ease chilblains, these people used to put their shoes under the bed "so's they point toward the rud." Or they rubbed their feet with kerosene or turpentine or pigs-foot oil, or painted on oil of spike (lavender) with a feather. Or they cut an onion, salted it and rubbed the cut surface on their feet. Or they walked barefoot on a cold painted floor or in the snow.

Herb Doctors

Usually one person in a community became especially adept at the preparation and prescription of these herbs, and became known around the countryside as a good "herb doctor" — like "Aunt" Samuel Crosby, of Hebron, "Aunt Head," of Sandwich, and half-Indian "Doctor Dodge," of Groton. Very often the herb doctor and midwife were combined in one person. Some even became very successful quacks and competed with regular practitioners of medicine. Such a one was Samuel Thomson, who was born in Alstead in 1769. The peregrinations of this "traveling" doctor included Alstead, Walpole, Surry, Portsmouth, Hillsborough, Royalton, Warwick, Salisbury Mills and Exeter in New Hampshire, Eastham, Newburyport and Salem in Massachusetts, Woodstock, Jericho and Georgia in Vermont, and Kittery and Eastport in Maine. In the last-named town he boasted that he drove three of the five regular physicians out of practice. He sold "rights," that is, memberships in his so-called "Friendly Botanic Society," to his system of treatment, which he patented in 1813. His aim was to raise the "inward heat above the outward" by the use of lobelia, which promoted free perspiration, and cayenne pepper (capsicum); to "cleanse" the stomach by giving an emetic; and, when necessary, to use a steam bath followed by a concoction of bayberry, sumac, hemlock bark, witch-hazel leaves, red-raspberry leaves and marsh rosemary, or any two or three of these, to "clear the canker." He "cured" cancers with pipsissewa, and was greatly annoyed at the ingratitude of "cured" patients and his constant persecution at the hands of the regular members of the profession.[7] In 1809 he was accused of killing a patient with lobelia.

The Herb Project

There has recently been a revival of interest in the cultivation of medicinal herbs in New Hampshire. To help recoup the fast-dwindling agricultural income of the state the Department of Agriculture established in 1936 an herb nursery at Pembroke, aided by a WPA "Medicinal Herb Project," to the best of my knowledge, the only one of its kind in the country. This agency grows and distributes among small farmers seedlings of herbs suited to New Hampshire culture and finds a ready market for the cultivated herbs. This season 48,000 herb plants were distributed to seventy-two growers in forty-seven towns. For practical purposes the state herb nursery concentrates on ten herbs, advising new growers to limit themselves to these: catnip, digitalis, peppermint, sage, spearmint and pyrethrum (perennials), and summer savory, winter savory, sweet basil and sweet marjoram (annuals). The following medicinal herbs can also be cultivated with profit in New Hampshire: rosemary, stramonium (Jimson weed), thyme and valerian.[8]

* * *

One may be amused at the faith that these people placed in the healing virtues of their herbs, but it is nonetheless true that modern research has substantiated many of the old ideas. After all, it was from old English folklore that Withering culled the idea that digitalis was useful in dropsy. And it is not at all inconceivable that some of the remedies listed above may have a like rationale.

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DEFICIENCY DISEASES: THEIR DIAGNOSIS AND TREATMENT*

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SCURVY as a clinical problem supposedly disappeared decades ago from general medical practice. Pellagra, as a fully developed symptom complex, is rare in northern latitudes. Isolated symptoms clinically, pathologically and therapeutically indistinguishable from those of pellagra may be found in any hospital ward. Beriberi, supposedly a disease of only rice-eating populations of tropical lands, may be seen regularly in any large community.

The extent to which information gained from study of obvious deficiency disease may be applied to the problems of clinical medicine has not been realized. Many symptom complexes of previously unknown etiology, such as pernicious anemia and sprue, are now included under the heading of deficiency disease, and there is a constant tendency so to include an ever-increasing number of pathologic conditions.

Purely laboratory investigations of the effects of inadequate diet have given diverse and often conflicting results. Such a mass of contradictory data has appeared that the application of the results of animal experimentation to the problems of disease in human beings is uncertain.

The purpose of this report is to present a simple outline of deficiency diseases as they are seen in man, and to discuss certain principles on which their successful recognition and treatment depend.

DEFINITION

As employed in this report, the term "primary deficiency disease" is applied to those marked conditions that follow an intake of certain dietary constituents inadequate to maintain health in normal persons. It is, however, most important to recognize that deficiency disease may occur despite a diet sufficient for the average person. This occurrence is due to an increased demand for the essential dietary substances or to certain factors which interfere with their delivery at the site of their utilization in the form in which they are utilized. Symptoms like those of primary deficiency disease which occur despite a diet adequate for normal persons are termed manifestations of "secondary deficiency disease."

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RECOGNITION OF DEFICIENCY DISEASE

The recognition of the characteristic symptom complexes of dietary lack such as beriberi, pellagra and scurvy is relatively simple. The clinical pictures are striking, and the improvement which follows the administration of the proper dietary compounds is dramatic.

A more serious clinical problem concerns the recognition of disease manifestations as due to a deficiency when the familiar complete symptom complex is not present and the dietary lack is not obvious. For example, it is held that the stomatitis and atrophic glossitis of pellagra differ in no respect, either morphologically or in their response to therapy, from the stomatitis and glossitis which occur in certain patients without dermatitis, diarrhea and delirium; and the peripheral neuritis of beriberi in the Philippines is symptomatically and therapeutically similar to the peripheral neuritis of alcoholism which is encountered in Bellevue Hospital.

Clinical and experimental evidence make it clear that almost every system of the body may be affected by a lack of essential food constituents. The different manifestations may be present together in a complete symptom complex such as pellagra or pernicious anemia. In other cases only certain components of the complex may appear independently, such as glossitis, combined system disease or diarrhea. These individual symptoms appear to respond to specific dietary therapy quite as well as the complex as a whole.

It becomes apparent that the degree of deficiency and the susceptibility of the patient are such potent factors that the manifestations of dietary lack may be exceedingly varied and difficult of recognition. The diagnosis of individual symptoms that appear in the absence of a complete disease complex is suggested by the morphologic similarity of the lesions to those seen in classic deficiency disease, and is confirmed by the response to specific therapy.

CAUSATION OF DEFICIENCY DISEASE

Improper diet as the cause of primary deficiency disease has been recognized since the time of the Crusades, and the dramatic results of the specific therapy of scurvy, of pellagra and of beriberi are among the most striking of modern medicine

Only recently has the more obscure secondary deficiency disease that occurs despite an adequate dietary intake been understood. It is with the varied manifestations of this condition that the clinician is concerned most frequently, and illustrative material can be obtained from a study of the disturbances of blood formation that result from a lack of certain food constituents.

This material can be employed because changes in hematopoiesis are sensitive indicators of effective therapy, and lend themselves to graphic representation. Neurologic changes, cutaneous alterations, lesions of the mucous membranes, disturbances of ocular function or even such a subjective factor as appetite could be employed, however, if quantitative methods for their estimation were available.

At least six different mechanisms are now known to exist by which secondary deficiency diseases may develop. These will be discussed in order.

The first is loss of essential dietary substances by diarrhea. Study of the symptomatology of the morbid states characterized by protracted diarrhea such as that accompanying ulcerative colitis, chronic dysentery and intestinal tuberculosis reveals that changes of the skin, of the mucous membranes and of the blood are frequently encountered (Mackie and Henriques[1]). These changes are similar in all respects to the lesions of the same organs that are seen in deficiency disease due to obviously inadequate dietary intake. They are assumed to be caused by a simple loss of vitamins from the bowel, because they frequently disappear when the diarrhea is checked although other factors remain unchanged.

The second cause of secondary dietary deficiency is an interference with the absorption of essential food substances. This mechanism is seen particularly in conditions in which dysfunction of the intestinal tract has been a feature for a considerable period, as in sprue. As this disease progresses the hematologic response to orally administered therapeutic agents becomes progressively less, although the response to the same substances parenterally administered remains unchanged (Castle and his co-workers[2]).

The third cause is a failure of the body to convert dietary constituents into the form in which they may be utilized. Such a mechanism obtains, for example, in the secondary deficiency known as pernicious anemia. In this condition, as has been shown by Castle and his co-workers,[3] there is failure by the stomach to secrete a ferment that is necessary to convert some dietary constituent similar in distribution to the water-soluble, heat-stable, vitamin B into the form that is required for proper hematopoiesis. The result is precisely what would be expected if the dietary constituent to be converted in the intestine were withdrawn from the food, as shown by the experiments of Wills.[4]

The fourth mechanism is made operative by the inhibitory power of infection on the action exerted by the essential food constituents. This mechanism is seen very frequently in a mild form in infectious disease. One of the most striking effects may be evaluated quantitatively from the reticulocyte response in pernicious anemia (Smithburn and Zerfas[5]).

The fifth mechanism is a congenital requirement for an abnormally high intake of certain dietary factors. The extraordinary variability in the response of different persons to the same dietary lack has been a prominent feature of all deficiency disease. Only recently, however, has experimental proof been available. The work of Brown[6] has shown beyond question that certain young rabbits are abnormal at birth and will inevitably die unless the diet is supplemented by large amounts of certain vitamins. When this is done the animals may be kept in perfect health, but if the unusually great intake of vitamins is discontinued, disease symptoms recur. It is inferred that similar individual variations of lesser degree are operative in the cause of deficiency states in human beings.

The sixth mechanism involves an increased demand for accessory food factors properly to detoxify certain poisonous compounds. As indicated by the evidence at hand, however, it appears that certain amounts of a toxic compound such as dimethylamidoazobenzol may be tolerated by a normal animal when fed a normal diet. If the content of the diet in certain vitamins (probably related to vitamin B) is decreased, symptoms promptly occur (Suguira and Rhoads[7]).

Treatment of Deficiency Disease

Certain fundamental principles are of the greatest importance in the treatment of the conditions under discussion, and unless these principles are observed the results are very frequently unsatisfactory. Four such principles will be here discussed.

The Threshold Requirement

In treating such conditions as pellagra and sprue, and at times pernicious anemia, clear evidence is at hand that a well-defined quantitative requirement for therapy exists. If less than the required amount is given, no response is obtained. Once the requirement is exceeded, however, even

if on only one occasion, a distinct effect can be detected.

Analysis of case records in which specific vitamin therapy is stated to have failed reveals that the commonest cause of failure is insufficient dosage. Because minute amounts of food constituents relieve experimental deficiency states in animals, it is assumed that similar amounts will be effective in man. This emphatically is not the case, and therapy must be pushed until the desired effect is produced.

The objection will be raised that overdosage of certain vitamins, for example, vitamin D, have been shown to be toxic to animals. This is undeniably true, but it is equally true that the margin between the therapeutic and the toxic dose is so great that it is doubtful whether overdosage of human beings can be effected except by intent.

Parenteral Administration of Therapeutic Agents

In view of the role of decreased absorption from the intestinal tract in the causation of deficiency disease, it is clear that treatment should be administered parenterally in case the oral route has given unsatisfactory results. Here again, pellagra, sprue and pernicious anemia afford striking proof. The studies of Castle and his co-workers[8] in sprue have advanced unequivocal evidence that certain cases may be wholly refractory to oral treatment. Only by intensive parenteral treatment may satisfactory results be achieved.

Multiple Deficiency States

From the very nature of the manner in which deficiency disease develops, it is apparent that symptoms due to lack of only one specific food constituent must be rare. Dietary intake, if poor, is almost always low in several accessory factors, and if symptoms are due to vitamin loss rather than to insufficient intake, the same situation obtains. Successful treatment depends on supplying all the elements which are lacking. If, for example, a case of anemia due to lack of two substances such as liver extract and iron is treated by the administration of either substance alone, only a partial remission can be expected.

Use of Concentrated Vitamin Preparations

From experience it has been concluded that the use of highly concentrated and purified vitamin preparations is to be avoided. If the necessity of parenteral administration requires a concentrate, it should be supplemented by crude material given orally. Knowledge of the nature of vitamins and the effects of their lack is fragmentary, and only incomplete conclusions concerning human disease can be drawn from animal experimentation. The preparation of concentrates invariably involves some loss of active material.

* * *

In conclusion, primary and secondary deficiency disease have been defined and their mode of production analyzed. Certain principles of treatment have been discussed. If the material here presented is effective in suggesting the possibility of deficiency disease as a cause of obscure symptoms encountered in clinical practice, I shall consider my report justified.

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Discussion

Dr. Simon Stone, Manchester: We all should be grateful to Dr. Rhoads for the excellent summary he has given us in the use of vitamins in medicine. We all use vitamins, and sometimes I wonder if we are not using too much of them. After hearing Dr. Rhoads's paper, I believe that perhaps I have not been using enough. I should like to emphasize again the need of using the entire complex, instead of a small part of it.

Dr. Rhoads did not say much about vitamin E. Probably that was for a definite purpose. Vitamin E has come into use in the last two years. Its discovery was made by Evans in 1922, and reported in *Science*. He found that in certain cases of sterility it could be supplied by the addition of certain foodstuffs to the diet. In 1927 he published a book which is probably a landmark in vitamin therapy called *The Anti-Sterility, Fat-Soluble Vitamin E*. It dealt with the sterility in rats that could be produced by depriving the animal of vitamin E and could be cured by the addition of it. Evans mentions paralysis of young rats, which developed after their mothers had been deprived of this vitamin. A year later he published another paper with Burr, dealing with paralysis in young rats suckled by mothers deprived of vitamin E. This work remained forgotten for a time, but within the last two or three years Evans has devoted himself to paralysis in animals, and also in human cases, in which vitamin E deficiency is considered to be one of the major causes. Within the past year, Wechsler published a paper dealing with the use of vitamin E, in animals and in human beings, for lateral sclerosis, in which vitamin E deficiency is considered to be one of the major causes.

In April, 1939, we began an investigation at the Balch Hospital on the use of vitamin E in muscular dystrophies. We have treated about 20 patients so far, and in about 10 of them have obtained excellent results. In the past, cases

with muscular dystrophy were considered to have a poor prognosis. Various diets have been given, as well as injections of aminoacids, thyroid adrenalin, without producing satisfactory results. Some of our patients who had considerable difficulty in getting around are now walking quite well. We have also noted definite changes in the musculature of these patients. Previously the muscles were fatty and flabby and had no tone; since then their condition has changed to normal.

There are other conditions in which vitamin D or B probably is important, such as tabes dorsalis and possibly some other types of muscular atrophy. We are investigating some of the uses of vitamin E in such conditions, through the assistance of the Venereal Control Department and the Crippled Children's Services.

I should appreciate it very much if Dr. Rhoads could tell us about the recent advances in the work with vitamin E.

Dr. Harold D. Levine, Bristol: I should like to ask Dr. Rhoads if he can say anything about the significance of a coated tongue.

Dr. Ezra A. Jones, Manchester: I should like to ask Dr. Rhoads if he is using vitamin D for delayed union in fractures.

Dr. Frank N. Rogers, Manchester: In addition to the question on coated tongue, I should like to include one on the type of tongue known as the geographic tongue. Is that condition related to an avitaminosis? Also, should massive initial doses of vitamin D be given for the cure of rickets?

Dr. Ralph W. Hunter, Hanover: I should like to ask Dr. Rhoads if there are any toxic effects from overdoses of vitamin B. Also, does brewer's yeast contain all the factors of vitamin B?

A Physician: I should like to ask Dr. Rhoads about the effectiveness of large doses of vitamin D in psoriasis.

Dr. Rhoads: As to the question regarding vitamin E in lateral sclerosis: Of course, everyone was highly excited by Wechsler's contribution to this subject. I believe that the group at the New York Hospital have been pursuing the matter with some intensity, but I personally have not had any experience with it. I think that the work just mentioned here is one of the most clear-cut studies of which I have heard. Certainly, so far as New York is concerned, an insufficient number of cases have been treated to warrant any conclusion.

An answer to the question concerning coated tongue must be somewhat speculative, I think. In some cases, coated tongue represents a very early stage of acute glossitis. We have followed a number of cases of coated tongue through to the peeling off of the surface and the leaving behind of the red, beefy, atrophic epithelium; this suggests that at least one form is a manifestation of deficiency disease.

As to the use of vitamin D in nonunited fractures, no more can be done with this vitamin, so far as I know, than to make it possible for the patient to absorb calcium. The latter may be decreased by a variety of disorders of the intestinal tract, hence vitamin D is extraordinarily useful in treating secondary calcium deficiency by supporting the absorption of calcium. I have had no practical experience with the problem of ununited fractures, but from the experimental work, I am inclined to think that I should treat any cases of delayed union with enough vitamin D to ensure proper absorption of calcium. But calcium must be given too. The giving of vitamin D will not result in the absorption of calcium that is not there.

Geographic tongue is a very interesting condition, but I do not know very much about it. People with pernicious anemia are likely to have it. I have been inclined to believe, with others, that it occurs in patients with the abnormal mucosa that may result in pernicious anemia, if the strain is severe enough. I do not believe that this condition, as ordinarily described, can be cured by the vitamin B complex. However, it is sometimes associated with atrophy of the tongue, which can be cured readily.

As to the use of vitamin D in rickets, one of my patients with this disease is now taking 200,000 units of vitamin D a day. He simply does not absorb it normally; hence he does not absorb calcium. In the classic studies, as high as 1,000,000 units a day has been given for a week to get proper calcium levels. As with all these vitamins, it must be given in sufficient quantities to obtain the desired effect. No rule for dosage can be laid down, because there are so many other factors involved. If one wishes to cure rickets, one must give enough vitamin D, as well as calcium and phosphorus, to obtain normal levels. Of course massive doses can be toxic, and the patient must be closely watched.

As to the toxic effects of vitamin B complex, I have had a certain number of patients complain of jitters and dizziness with heavy doses of vitamin B_1 (up to 100 mg. a day). I have known other physicians who have complained that their patients had similar symptoms. I do not believe that these are serious. Of course 100 mg. a day is a large dose, and in my experience it is given only rarely.

I know of no dose of riboflavin that is toxic. I have never given more than 20 mg. a day for two weeks, so that I am not in a position to judge its toxicity. I have given animals 500 mg. a day without toxic effect.

Nicotinic acid will, in many patients, give a distinctly toxic reaction in the form of flushing, palpitation and a feeling of pressure in the pit of the stomach. I do not know why it does not do this all the time. The irregular effect is a problem. I doubt if one needs to give the compound to the point of toxic symptoms. With continued heavy doses of nicotinic acid, certain patients lose weight and become quite sick. This is a danger which one must consider. There is an overdosage factor, beyond question, but I do not believe that it results in permanent damage.

As to brewer's yeast, I should say that its success depends on the way it is prepared. If it is oxidized by exposure to the air some constituents are lost. If it is boiled long enough, the vitamin B_1 element will of course be destroyed. Practically, brewer's yeast does contain all the factors described, provided it is a good quality of yeast and is properly prepared. This is true of Fleischmann's 2040, for example. It has a completely adequate supplement to basic diets in animals, and, so far as we know, it contains all the factors. I do not believe that all yeasts are of the same quality. The whole question is difficult, indeed, because yeast is hard to take. We are now trying to provide a yeast that can be taken and is effective. The evidence is clear that in yeast many factors are needed and cannot so far be obtained from a bottle sold by the drug houses.

As to psoriasis, I have not seen any striking cures brought about by vitamin D. I certainly am not satisfied that vitamin D is specific for psoriasis, but I am glad to accept the evidence as it appears. Physicians at the Mayo Clinic assure me that they have had dramatic cures of

psoriasis. They give doses of vitamin D that ought to be toxic, but they say they are not. I should not dare give as much of it as they do. They say that they watch the blood calcium carefully, and have had cures in a large number of cases. I have not had enough personal experience to warrant any statement.

While I am on the subject of vitamin D, it might be worth while mentioning that the various reports that are appearing concerning the cure of arthritis by this vitamin are not substantiated, at least in my experience. I have never seen any case of arthritis cured by any vitamin.

HOW MAY THE GENERAL PRACTITIONER DIAGNOSE CANCER OF THE UTERUS?*

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THERE are several reasons why the recognition and the treatment of cancer of the uterus are important. Cancer is one of the great killers of mankind. It occupies first rank, being second only to cardiovascular disease. It is very frequent in the breasts and uteri, women being particularly susceptible to this disease. When neglected by patient or doctor, cancer grows beyond control, and marches rapidly to irrevocable, intolerable suffering and death. If detected and properly treated early in its course, health and life may be prolonged, and the natural life span may be completed. It is important to realize that cancer is a curable condition, and that, as in other diseases, the percentage of favorable results obtained depends on early diagnosis and appropriate treatment.

We are here concerned with cancer of the uterus, which occurs in the age groups above twenty-five. It is of various cellular types, which occur with varying frequency at different sites. The usual sites are the vaginal portio, the endocervix and the corpus of the uterus. Some state that in 100 cases about 85 occur in the portio, 10 in the corpus, and 5 in the endocervix. Others believe that about 17 per cent of uterine cancer occurs in the corpus. My own relatively small series shows 50 per cent of uterine carcinoma in the corpus — an unusually high incidence. Primary carcinoma of the vagina is relatively uncommon, although it is frequently seen as an ultimate complication of carcinoma of the cervix.

It is often difficult to determine whether the primary site is in the upper part of the cervix or in the lower part of the corpus. One can classify these cases only very early in the course of development. It is, therefore, often difficult to tell whether or not those cases occurring in the region of the isthmus uteri are primarily corpus or cervix carcinomas. It is much easier, of course, to differentiate cervix and corpus carcinoma when the site is in the region of the external os or low in the cervix, or in the corpus of the uterus at a level higher than the isthmus. Microscopically, some of these cases should be differentiated by the type of epithelium, although cases of squamous-cell carcinoma have occurred in the endocervix and also in the corpus. It is fair to state that pure squamous-cell carcinoma and adenocarcinoma with mucous secretion are usually cervical in origin. The differentiation of cases that develop primarily in the upper portion of the cervix or the lower portion of the corpus is not so important clinically, since they are usually of analogous types and behave similarly. In cervical carcinoma, the corpus of the uterus is usually not enlarged unless there is some stenosis of the cervical canal leading to the formation of a hematometra or a pyometra, or unless there are some complicating neoplasms such as fibromyomas.

For many reasons it is important to reach some general agreement relative to the different stages of cancer of the cervix uteri. Unless some distinction is made and recognized between the different cases, it is impossible to evaluate the results of treatment and also to determine which is the best treatment for the different stages and types of carcinoma. The reports of the results of radiotherapy in cancer of the uterine cervix by the League of Nations College‡ in 1938 give certain definitions as approved in the year 1937. These

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‡League of Nations, Health Organisation. *Annual Report on the Results of Radiotherapy in Cancer of the Uterine Cervix.* Vol. 3. *Results Obtained in 1932 (Collated in 1938).* 149 pp. London: Allen and Unwin, 1939.

are modified somewhat from those approved in 1929, and are as follows:

Stage I

The carcinoma is strictly confined to the cervix.

Stage II

The carcinoma infiltrates the parametrium on one or both sides, but has not invaded the pelvic wall: *Stage II, Parametrium.* The carcinoma infiltrates the vagina, but does not involve its lower third: *Stage II, Vagina.* Endocervical carcinoma, which has spread to the corpus: *Stage II, Corpus.*

Stage III

The carcinomatous infiltration of the parametrium has invaded the pelvic wall on one or both sides; on rectal examination, no cancer-free space is found between the tumor and the pelvic wall: *Stage III, Parametrium.* The carcinoma involves the lower third of the vagina: *Stage III, Vagina.* Isolated carcinomatous metastases are palpable on the pelvic wall (irrespective of the extent of the primary cervical growth): *Stage III, Isolated Pelvic Metastases.*

Stage IV

The carcinoma involves the bladder, as determined by cystoscopic examination or by the presence of a vesicovaginal fistula: *Stage IV, Bladder.* The carcinoma involves the rectum: *Stage IV, Rectum.* The carcinoma has spread outside the true pelvis (below the vaginal inlet, above the pelvic brim, distant metastases): *Stage IV, Distant Spread.*

The general rules to be observed according to this report are as follows:

When allocating a case to a stage nothing but facts revealed by examination should be taken into account. The stage of each case should be decided upon examination prior to treatment, and this classification should remain. The classification should be postponed quite exceptionally and the reasons stated. When it is doubtful to which stage a given case is to be allocated the earlier stage should be chosen. The fact that a single case presents two or more of the conditions which characterize a single stage does not affect this statement.

The summary of the report, which is the third of the series, includes statements from six radiotherapeutic centers. The data from these different centers have been combined and together furnish information concerning 9061 patients who suffered from cancer of the uterine cervix, of which 7958 or 87.8 per cent were treated by radiation therapy. Table 1 shows the results obtained after the lapse of five years of this treatment.

Various attempts have been made to grade, on the basis of microscopic examination, both carcinoma of the cervix and carcinoma of the corpus. This grading has not proved to be entirely satisfactory and is not of great interest to the ordinary practitioner of medicine. About 5 to 10 per cent of the carcinomas of the cervix are of glandular, and the remainder are of the squamous-cell type. Practically all corpus carcinomas originate from the glandular epithelium. It must be borne in mind, however, that all cancers are not equally malignant.

No entirely satisfactory basis has yet been obtained by which one can prognosticate the ultimate outcome of a case of cancer. The most satisfactory basis for prognostication is the extent of the carcinoma when it is first seen. Not all types are equally amenable to treatment by radiation therapy. In general, it may be said that the less mature the cells and the less the degree of differentiation the more radiosensitive the cancer. Those that are more slowly growing, with the maturer type of cells, are more radioresistant.

TABLE 1. *Results After Five Years of Radiation Therapy.*

STATUS OF PATIENT	NO. OF CASES	PER CENT
Alive without recurrence	2194	27.6
Alive with recurrence (including those operated on after failure of radiotherapy)	128	1.6
Died of cancer	5368	67.5
Died of intercurrent disease	163	2.0
Lost sight of	105	1.3
Total	7958	

Of approximately 75,000 women who die annually of cancer, about 16,000 may be expected to die of cancer of the uterus. Statistics show that of women who reach the age of thirty, about 1 in 37 may be expected to die of cancer of the uterus. This hazard increases until about the age of fifty, after which it declines with the increased age attained by the woman. The age decade in which the disease is most frequent is that from forty to forty-nine, although the group between fifty and fifty-nine is a close second. Carcinoma of the corpus occurs more frequently between fifty and sixty, whereas carcinoma of the cervix occurs oftener between forty and fifty. However, one should realize that any woman after the age of twenty-five is subject to carcinoma of the cervix and of the uterus.

The mere fact that a woman has not borne children does not exclude this possibility, since approximately 10 per cent of the carcinomas of the cervix occur in nulliparous women, which is not particularly disproportionate to the total number of women in this age group who have not been pregnant. It should also be recognized that complicating conditions do not exclude carcinoma of the uterus. Carcinoma occurring during pregnancy is not particularly common, but apparently occurs about once in 7000 or 8000 pregnant women. Also, fibromyomas of the uterus do not exclude the possibility of a carcinoma either of the cervix or of the corpus. I have found about 2 per cent of

uteri with fibromyomas in which there was a complicating carcinoma. Thirty-eight per cent of cases of carcinoma of the corpus have fibroids. Furthermore, one must remember that when an incomplete hysterectomy has been performed, the cervix is liable to become the site of a carcinoma. It not infrequently happens that a carcinoma of the cervix may exist at the time of the removal of the corpus of the uterus and may be discovered subsequently. In the diagnosis of carcinoma of the uterus, therefore, it is important to bear in mind that these conditions mentioned above do not exclude the possibility of a carcinoma either of the cervix or of the corpus of the uterus. Precautions should be taken to make a diagnosis, particularly when an operation is to be performed for some plastic or other procedure, and especially in those cases in which the decision has to be reached relative to removal or retention of the uterus. In 1 per cent of the cases of incomplete hysterectomy, carcinoma of the stump is discovered subsequently. Statistics show that the increased mortality in total hysterectomy over incomplete hysterectomy does not warrant the former, in view of the low incidence of carcinoma of the stump. The five-year survival of carcinoma of the stump is 14 per cent, and of the cervix 22 per cent.

The diagnosis of carcinoma of the uterus is made on the basis of the history and the physical examination, but for a diagnosis the patient must report to the physician. Consequently, it is part of the physician's duty to his patients and community to stress the fact that any unusual symptoms associated with or originating from the uterus, such as irregular or profuse bleeding, — no matter in what period of life, — should be investigated and the cause determined.

The most significant symptom to which the patient's attention should be directed is any abnormal genital bleeding. This may consist in interval bleeding, profuse menstruation, prolonged menstruation, a short interval between menstrual periods, contact bleeding or recurrence of bleeding following the menopause. It seems to be a frequent impression among the laity, and not an uncommon one among physicians, that disturbances of menstruation or recurrence of the menstrual flow following its cessation in the menopausal period are symptoms that may be anticipated as a part of the normal climacterium. This is not a safe basis on which to stand, either for the patient or for the physician, and any case of postmenopausal bleeding should be studied carefully to determine whether or not there are any organic changes, particularly those associated with the development of early cancer. It is, therefore, the early diagnosis that one should stress. In the early diagnosis, palpatory findings, bimanual examination and speculum examination are of the utmost importance. I have frequently seen women who have reported previously to physicians and have not been examined, with the result that cancer has been overlooked for the time being. Therefore, the first essential that should be kept in mind by the practicing physician is that any such woman seeking medical advice must have a physical examination, including examination both with the fingers and with the speculum. Admitting that it requires considerable experience to detect early lesions and to be certain that they are cancerous, it is ordinarily not very difficult to detect a suspicious lesion on the cervix, when the case should be referred to someone who is more experienced than the practitioner for diagnosis, or a biopsy should be made and the tissue subjected to microscopic examination.

What conditions on a cervix may confuse the diagnosis of early carcinoma? The commonest lesion is erosion, with or without laceration of the cervix. Another is a polyp or papillary growth. The so-called "Nabothian cysts" are not ordinarily confused with a carcinomatous nodule. Small ulcers on the cervix also occur, sometimes in association with and sometimes independent of cervical erosion. The patient may report that she noticed a slight blood stain following intercourse or the taking of a douche. Such a patient should be carefully examined. One may find on the cervix a small lesion that bleeds easily on contact. If a polyp is present, it should be removed and subjected to microscopic examination. Malignant polyps are relatively rare; however, one not infrequently finds a cervical polyp associated with a carcinoma of the corpus, and in such cases the bleeding may be thought to be due to the former whereas it arises in the latter. Bleeding papillary growths and noncystic nodules should be removed for microscopic examination.

The so-called "Schiller test" — the application of an aqueous solution containing 0.3 per cent iodine and 0.7 per cent potassium iodide — may reveal a suspicious area. If an unstained area shows with this test, there is always a possibility of a cancer. The Schiller test depends on a quality of the squamous epithelium for absorbing iodine and taking a mahogany stain, whereas a cancerous area may remain unstained. The greater the experience of the observer, the more valuable a special test, such as this, becomes. It should not, however, be falsely interpreted. Nonmalignant as well as malignant lesions fail to stain with iodine, owing

to the absence of glycogen. The Hinselmann colposcope gives one an enlarged picture of this area, which has to be interpreted by the observer as the lesion would when observed with the naked eye. Neither of these procedures enables one to make a positive diagnosis of cancer. They merely point out suspicious areas.

In obtaining biopsy specimens the practitioner should be careful to secure an adequate piece of tissue, including the suspicious area or a portion of it, and also including some normal tissue on either side of the suspicious area if it is not too large to be thus excised. The early stages often present difficulties from the standpoint of both gross and microscopic diagnosis. It is, therefore, important that the microscopist know exactly the source of the tissue and have a specimen adequate for examination. There are many confusing pictures in tissue removed from the cervix, and one who is expert should make the microscopic diagnosis. Accuracy depends not on the microscope, but on the skill and ability of the one making the diagnosis.

The recognition of lesions of the endocervix and of the corpus of the uterus is more difficult, because these areas cannot be visualized. The symptoms are about the same, and consist in abnormal bleeding. Contact bleeding is less common from lesions in the endocervix and in the body of the uterus. Interval bleeding is common in both, but perhaps more so in lesions of the endocervix. Corporeal lesions are more inclined to produce profuse or prolonged menstruation, or recurrence of the menstrual epoch following the cessation of menstruation. Early in the course of carcinoma these lesions of the corpus and of the endocervix produce few, if any, gross physical findings.

When an endocervical lesion is suspected from the history, a probe or cotton applicator passed into the cervical canal will reveal some roughness, possibly excavation or possibly stenosis or contact bleeding. If such evidence is found, it may be necessary to secure a biopsy specimen with a sharp curette introduced into the cervical canal, by which sufficient tissue for microscopic examination can be secured. The palpatory findings may be significant by revealing an area of peculiar hardness, except in cases of papillary carcinoma, when the growth is unusually friable. In some cases a fine probe passed into a suspicious area produces a parchmentlike resistance.

Malignant lesions of the corpus are even more obscure, and produce no visual and practically no palpatory findings in their early course. There is virtually no asymmetry or enlargement of the uterus in the early stage. These occur only after the process has advanced to a considerable degree. The only means of making an early diagnosis is by the use of diagnostic dilatation and curettage, which should be resorted to quite freely in suspicious cases. In my series of cases curetted for suspicious corporeal bleeding, there was microscopic evidence of carcinoma in approximately 16 per cent, and approximately 4 per cent of these were without any evidence of cancer on physical examination. In moderately advanced cases, of course, there is enlargement or asymmetry of the uterus, and in cases that are still more advanced there may be some fixation and spread to the surrounding tissue, with evidence of induration and lymphatic involvement. One should strive for early rather than for late diagnosis.

The recognition of late or advanced cancer presents little difficulty. The pain, discharge and bleeding are more or less characteristic. Physical examination may reveal definite physical findings in and about the cervix of the uterus that make the diagnosis relatively easy to determine. Other conditions that come under consideration are the granulomatous lesions due to syphilis, tuberculosis or other venereal diseases. Relatively speaking, the importance of diagnosis of late uterine cancer is of little significance because the outlook for cure is bad, and although some of the unpleasant symptoms may be eliminated and life somewhat prolonged, the possibility of cure is relatively remote.

The symptom of pain in cases of late carcinoma has unfavorable prognostic significance. Also symptoms referable to neighboring structures, such as the bladder and rectum, occur in advanced rather than early cases. Cachexia, which used to be stressed as a diagnostic sign, is largely a misnomer; it is in no way peculiar to cancer, but is the result of blood loss, infection and interference with the nutritive processes and other important functions of the body.

The treatment varies with the site, type and stage. Practically all agree at the present time that radiation therapy is the preferential form of treatment for carcinoma of the uterus. Whether or not this should be supplemented by surgery depends on the stage of the case when it is first recognized, and on the services available for radiation therapy and surgical methods. Two types of surgical procedure may be used: first, radical treatment, which includes the extensive removal of all actually and potentially involved parts; secondly, adjuvant treatment, which supplements radiation therapy by procuring better radium application or by removing involved structures that are not accessible or susceptible to radiation therapy. These questions usually have to be settled by the

expert in the management of carcinoma of the uterus. However, the practitioner should be conversant with some of the methods to be used, and should advise the patient accordingly, after making the diagnosis.

A protest should be voiced against the indiscriminate employment of radium and deep x-ray therapy by those who are not versed in their use. Improperly used these agents become either ineffective or dangerous or both. Their value depends on their proper use and not on the radioactive agent itself.

The general practitioner is often the first to be consulted in cases of uterine cancer. He should make a diagnosis and see that appropriate treatment is instituted without delay. Every week lost in making a diagnosis and in instituting treatment reduces life expectancy and lessens the chances of cure.

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HERPES ZOSTER: LOCAL ANESTHESIA IN THE TREATMENT OF PAIN

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HERPES zoster is a disease of unknown etiology that may occur alone or in combination with a wide variety of diseases of the spinal cord or posterior root ganglia. The disease is characterized by severe pain in the distribution of one or more nerve roots and the appearance of tense vesicles on a highly inflammatory base in the area innervated by these roots.

Evaluation of the treatment of herpes zoster is extremely difficult on account of the variations in the severity and duration of the pain, and the site and destructiveness of the local lesions. In children the disease is usually mild, and sequelae are rare; in older people, however, relatively minor skin lesions may be accompanied by severe, excruciating neuralgic pains that persist for many months or years after the skin lesions have disappeared.

The present-day treatment of herpes zoster consists in local therapy to the skin lesions, medication for the relief of pain, and medical or physical therapy directed toward a cure of the inflammatory process in the posterior root ganglia. Treatment of the local lesions with dressings or poultices should be avoided, since they are apt to increase the incidence of secondary infection. A simple calamine lotion or a dry antiseptic dusting powder is useful. The results with local anesthetic ointments are in general disappointing.

Specific therapy of the inflammatory process in the posterior root ganglia has not yielded any striking results. Among the therapeutic agents that have been tried are posterior pituitary extract (Sidlick[1] and Niles[2]), x-rays (Vignal,[3] Keichline[4] and Pillsbury and Fondé[5]), sodium iodide (Ruggles[6] and Pillsbury and Fondé[5]), sulfapyridine (Sutton and Sutton[7]), foreign-protein, and ultraviolet or infrared light. Although many of the above methods of therapy were used with the hope of relieving pain, the rationale behind most of them was to produce an amelioration of the inflammatory process in the posterior ganglia.

Treatment of the pain of herpes zoster has usually been with drugs of the coal-tar series; morphine and codeine have been avoided because of the danger of addiction. Rosenak[8] reported relief from pain and regression of the vesicles after intravertebral and paravertebral injections of 0.5 per cent aqueous procaine solution, and Hollander[9] in 1938 showed that an oil-soluble anesthetic could be injected subcutaneously in the hyperalgesic areas with prompt relief of the pain, without recurrence when the anesthesia wore off four weeks later.

It is the purpose of this article to report the results of the treatment of 15 unselected cases of herpes zoster by the method of Hollander.

MATERIAL AND TECHNIC

Most of the patients received injections of 0.5 to 2.0 per cent novocain, with or without adrenalin. Three preparations of anesthetic oil were used: Nupercain (Ciba), Hollander's formula and the following modification of Hollander's formula:

Benzocaine	3
Benzyl alcohol	10
Phenol	1
Oil of sweet almond	*q. s. ad* 100

The areas of hyperesthesia were mapped out by the usual methods (pinprick, brush or pinching). These areas were cleansed with 95 per cent al-

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cohol, and infiltrated subcutaneously with the therapeutic agent until there was total anesthesia. The smallest-gauge needle possible (novocain, 25; oil, 21 to 22) was introduced at the periphery of the predetermined area of hyperesthesia, and small quantities of the anesthetic agent were deposited in the tissues in a fan-shaped manner to underlay the entire hyperalgesic area. When vesicular, papular or pustular lesions were present, the anesthesia agent was injected immediately under the inflammatory tissue. The criterion for successful injection was complete loss of all cutaneous sensation in the injected areas. The absence of nerve block was indicated by the fact that anesthesia was confined to the area injected. Care was taken to see that the oil did not pool in small areas by massaging lightly after the injection was made.

Results

Results were considered satisfactory when the anesthesia produced by the injection was accompanied by complete relief of the pain. Local therapeutic measures were avoided except for the protection from infection. The usual duration of anesthesia from novocain was from one to two hours, and that from the oil solution about one week.

Fourteen patients were injected with novocain, with complete relief of pain immediately after the injection in 13 (Table 1). The duration of this relief varied from one to thirty or more hours, after which pain recurred with equal or greater severity in all but 4 patients. Reactions to novocain were limited to slight local soreness and tenderness on pressure. In one patient (Case 13), the pain was made worse by the injection of novocain.

Eight of the 14 patients injected with novocain and one other (Case 5) were subsequently treated by injection of the anesthetic oil. Four patients did not receive the latter treatment because there had been complete relief of the pain from the novocain injection, and in the remaining 2 further treatment was refused. There was complete relief of the pain in 7 of the 9 patients injected with the oil anesthetic. One patient (Case 14) was entirely free of pain for six months but later developed postherpetic neuralgia, and another (Case 15) suffered an increase in the pain after the injection and developed postherpetic neuralgia. Local reactions to the injection of the anesthetic oil were soreness, redness, swelling and pain at the site of the injection. Two patients experienced mild chilly sensations, and there was a possible febrile reaction in 1 (the temperature was not recorded). The duration of these side reactions varied from a few to forty-eight hours, and they were controlled by local applications of heat or analgesics by mouth. No accumulation of oil or abscesses occurred. In 2 patients there was a local infiltration at the site of the injection for as long as three weeks.

The results on the whole, were encouraging. Relief from the acute attack was experienced by 13 of the 15 patients treated. Ten of 13 patients followed for a period of six to twenty-one months were permanently relieved of all discomfort. There were 3 failures, 1 with novocain and 2 with a combination of the two anesthetic agents. In the first patient (Case 13) the injection of the novocain produced an increase in the pain, and in the second (Case 15) injection of the anesthetic oil produced an exacerbation of the pain, although temporary relief from the pain had been obtained previously with an injection of novocain. A satisfactory response to both anesthetics was noted in the third patient (Case 14), but complete relief of all discomfort for a period of six months was followed by a classic postherpetic neuralgia.

The clinical course of the skin lesions was not affected. Regression of the vesicles occurred in

Table 1. *Results of the Treatment of Herpes Zoster with Novocain and Anesthetic Oil.*

Case No.	Age	Site of Lesion	Duration of Herpes	Duration of Relief after Novocain Injection	Duration of Relief after Anesthetic Oil Injection	Period Observed	Final Result
	yr.		*days*			*mo.*	
1	59	Intercostal	10	1 hour	Permanent	17	Permanent relief
2	56	C 7	6	Permanent	—	17	Permanent relief
3	65	N V 1st Div.	5	Permanent	—	9	Permanent relief
4	18	Intercostal	5	Permanent	—	18	Permanent relief
5	15	D 12	4	—	Permanent	21	Permanent relief
6	37	D 1	7	1 hour	Permanent	15	Permanent relief
7	20	N V 2nd Div.	7	Permanent	—	17	Permanent relief
8	15	Intercostal	3	1 hour	Permanent	8	Permanent relief
9	68	Intercostal	3	30 hours	Permanent	6	Permanent relief
10	52	D 1 + D 2	4	42 days	Permanent	20	Permanent relief
11	33	Intercostal	5	6 hours	—	0	Satisfactory
12	30	Intercostal	3	9 hours	Permanent (?)	¼	Permanent relief (?)*
13	65	Intercostal	35	0 (worse)	—	9	Postherpetic neuralgia
14	65	Intercostal	60	2 hours	6 months	12	Postherpetic neuralgia
15	60	Intercostal	21	5 hours	0 (worse)	3	Postherpetic neuralgia

*Patient did not return for further observation.

the expected seven to fourteen days.[7] Postherpetic neuralgia occurred only in patients of the older age group (sixty to sixty-five years). Two cases (not included in this series) of classic postherpetic neuralgia failed to respond to this method of treatment.

Although relief of the pain was the main object of these injections, it was gratifying to note that loss of the pain was accompanied by amelioration of muscular disabilities, improved appetite, normal sleep and ability to return to work in several patients.

Summary

Local anesthesia produced by subcutaneous infiltration of the hyperalgesic areas with novocain or oil-soluble anesthetics produced a relief from the pain in 13 of 15 patients with acute herpes zoster. The duration of the relief after the injection of novocain was usually from one to thirty hours, following which there was a recurrence of the pain. Seven of the 9 patients receiving the combination of novocain and oil solution experienced permanent relief of the pain.

The clinical course of the skin lesion was not altered.

Postherpetic neuralgia developed in 3 patients.

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A STUDY OF VITAMIN C NUTRITION IN A GROUP OF SCHOOL CHILDREN

Clinical and Laboratory Studies*

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THE observation of clinical evidence of vitamin C deficiency in a number of children in Maine during 1937 and 1938 aroused the concern of the director of the State Bureau of Health about the prevalence of vitamin C deficiency in the State. Studies of the foods produced and marketed in various parts of Maine had also suggested to the head of the Department of Biology of the Maine Agricultural Experiment Station the desirability of obtaining information concerning the food habits and the state of vitamin C nutrition of the population.

This study was undertaken to determine the state of vitamin C nutrition of a group of children attending an elementary school in a Maine village. Most of the children in this school were of French-Canadian extraction, and it should be pointed out that the results of the survey are applicable only to this one group.

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Material and Methods of Study§

Eighty-six children were studied in the autumn of 1938 and again in the spring of 1939. These children were unselected except for age and sex, so that there is no known reason why the state of nutrition of the group should be expected to differ from that of the population of 700 in the school as a whole. The group included 39 boys and 47 girls, ranging in age from seven to sixteen years. In general there were a few more girls than boys in each age group.

Physical examinations were made during the autumn survey. With the exception of the mouth conditions to be discussed later, no physical signs of vitamin C deficiency were recognized. Because of the difficulties involved in attempting to assess

§The authors express their appreciation to Miss Mary M. Clayton, of the Maine Agricultural Experiment Station, for advice and assistance with respect to technical methods, to Miss Elizabeth F. Murphy, of the same station, for assistance in the interpretation of dietary findings, to Miss Elizabeth M. Waters, nutrition consultant in the Division of Maternal and Child Health of the State Bureau of Health, for the collection of data relative to the diets of the children studied, to the personnel of the school in which the study was made, and to the local representatives of the State Bureau of Health, without whose wholehearted co-operation the study would not have been possible.

the general nutritional status and to correlate it with specific findings, the physical examinations were not repeated in the spring.

In the autumn and again in the spring the study of the 86 children included examination of the blood to determine the level of ascorbic acid in the plasma and examination of the gums by a dentist for clinical evidence of vitamin C deficiency. Furthermore, tests of tolerance to a dose of ascorbic acid were made on the urines of 49 children, and the therapeutic value of vitamin C in improving inflammatory conditions of the gums was tested in 41 children.

In interpreting the data obtained, caution is necessary because of the incomplete state of present knowledge as to the metabolism of vitamin C and the exact significance of specific values for vitamin C in blood plasma or urine, and also because of the limitations inherent in the analysis of a relatively small sample.

Results of Study

Examination of the Blood

Determination of the plasma-ascorbic acid values was by titration of macroscopic samples of plasma with indophenol.* Under the conditions of the present study, it was impracticable to make the determinations on fasting subjects, but the children were questioned regarding the foods eaten that day; only 7 of the 86 children in the autumn and 16 in the spring had eaten citrus fruit or tomato on the day of the test. For these children it is possible that the plasma-ascorbic acid values obtained may indicate a state of vitamin C nutrition superior to that which actually existed.

Table 1. *Values of Ascorbic Acid in the Blood Plasma of 86 Children Examined Both in the Autumn and in the Spring.*

Ascorbic Acid in Plasma	Autumn Examination		Spring Examination	
	No. of cases	per cent	No. of cases	per cent
mg./100 cc.				
0.00–0.19	10	12	20	23
0.20–0.39	29	34	34	40
0.40–0.59	20	23	19	22
0.60–0.79	14	16	2	2
0.80–0.99	6	7	2	2
1.00–1.19	6	7	2	2
1.20–1.39	1	1	6	7
1.40–1.59	–	–	1	1

The results of the autumn and spring determinations of plasma ascorbic acid are shown in Table 1. The lower limit for values indicating satisfactory vitamin C nutrition has generally been considered to be in the neighborhood of 0.80 mg. per 100 cc.[1–6] The majority of the children studied — 73 (85 per cent) in the autumn and 75 (87 per cent) in the spring — had values below this level.

Plasma-ascorbic acid levels below 0.40 mg. per 100 cc. have usually been found to be associated with vitamin C undernutrition.[1, 2–5] Most of the values obtained were in this relatively low range; 39 children (46 per cent) in the autumn and 54 (63 per cent) in the spring had values below 0.40 mg. per 100 cc. The total number of children who had relatively low values (less than 0.40 mg.) was considerably greater in the spring than in the autumn, whereas the number who had intermediate values (between 0.40 and 0.79 mg.) was smaller in the spring.

Because certain investigators believe that clinical manifestation of scurvy may occur in the presence of plasma-ascorbic acid values of 0.15 mg. per 100 cc. or less,[1, 4] it is worthy of note that the 10 children who had values below 0.20 mg. in the autumn, and the 20 children who had values in this range in the spring, actually had values of 0.15 mg. or less, yet none of them showed the classic signs of the disease.

Table 2. *Association between Autumn and Spring Values of Ascorbic Acid in the Blood Plasma.*

Ascorbic Acid at Autumn Examination	No. of Cases	Ascorbic Acid at Spring Examination			
		0.00–0.39 mg.	0.40–0.79 mg.	0.80–1.19 mg.	1.20–1.59 mg.
mg./100 cc.					
0.00–0.39	39	24	10	1	4
0.40–0.79	34	23	7	2	2
0.80–1.19	12	7	3	1	1
1.20–1.59	1	–	1	–	–
Totals	86	54	21	4	7

Table 2 shows the association between the values obtained in the autumn and those obtained in the spring. It is possible to see from this table the extent to which the children maintained relatively constant levels of ascorbic acid in the blood, or showed a rise or a fall in ascorbic acid values.

Of the 39 children who in the autumn had low plasma-ascorbic acid values (below 0.40 mg. per 100 cc.), 24 still had values within this range in the spring, and 15 had higher values (10 between 0.40 and 0.79 mg., 1 between 0.80 and 1.19 mg., and 4 of 1.20 mg. or more). Of the 34 children who in the autumn had intermediate values (between 0.40 and 0.79 mg.), 23 had dropped into the low group by spring, 7 remained at the same general level, and only 4 had values that fell into higher groups.

Twenty-four children, or 28 per cent of the entire group, had low values (below 0.40 mg. per 100 cc.) for ascorbic acid in both autumn and spring. In addition, 23 children, or 27 per cent, had intermediate values (between 0.40 and 0.79 mg.) in the autumn that dropped into the low group by spring. Therefore, 55 per cent of the 86 children had either

*The technic used was that published by Ingalls,[3] with slight modifications by Miss Mary M. Clayton, of the Maine Agricultural Experiment Station. Potassium cyanide was used in some of the first determinations made in the autumn but was omitted in all later determinations.

relatively low values at both examinations or slightly higher values in the autumn that had dropped to relatively low values by spring.

Only 2 of the 86 children had ascorbic acid values of 0.80 mg. per 100 cc. or higher at both autumn and spring examinations.

In the light of present knowledge of their significance, these values may be summarized as follows: Approximately 55 per cent of the 86 children had values of ascorbic acid in the blood plasma that are usually associated with vitamin C undernutrition — nearly 28 per cent were in the relatively low group in both autumn and spring, and about 27 per cent, who were in the intermediate group in autumn, had dropped into the low group in spring. Only 2 of the 86 children had plasma-ascorbic acid values both in autumn and in spring that indicated satisfactory vitamin C nutrition.

Tests for Vitamin C Tolerance

To check the evidence obtained from the plasma-ascorbic acid tests against another method for estimating vitamin C nutrition, tests of tolerance to a test dose of ascorbic acid were made on the urine.

Both urinary tolerance tests and plasma-ascorbic acid tests were made on each of 49 children — 23 were from the group of 86 unselected children previously described, and 26 were others from the school selected because of specific mouth findings — to determine to what degree the tolerance test would confirm the evidence given by the plasma-ascorbic acid values concerning the state of vitamin C nutrition of the group.

The procedure used in the urinary tolerance test was as follows:

> Urine was collected with special precautions for preservation of vitamin C during a control period of six hours on the first day, and the amount of ascorbic acid contained in the specimen was determined by titration with indophenol immediately at the close of the period. Plasma ascorbic acid was determined on the same day. The ascorbic acid excretion during a similar six-hour period was determined on the second day, but at the beginning of the period of collection the child was given 400 mg. of crystalline ascorbic acid by mouth. The excess excretion of ascorbic acid during the second period as compared with the first was considered to be the amount of the test dose that was excreted in the six hours following administration.

The results of these tests on the 49 children are shown in Table 3. Examination of the table shows that the 28 children who had plasma-ascorbic acid values of less than 0.40 mg. per 100 cc. excreted relatively small proportions of the test dose. Twenty-four excreted less than 2 per cent of the dose, and the other 4 excreted less than 10 per cent. In contrast, the 4 children with plasma levels of 0.80 mg. per 100 cc. or above excreted more than 10 per cent of the test dose, in some cases more than 30 per cent. Without attempting to attach clinical significance to the excretion of any specific amounts of the test dose, it is apparent that the results of the urinary tolerance test tend to confirm the evidence obtained from the plasma-ascorbic acid values as to the state of vitamin C nutrition of this group of children.

TABLE 3. *Association between the Value of Ascorbic Acid in the Blood Plasma and the Percentage of the Test Dose of Ascorbic Acid Excreted in the Urine.*

Ascorbic Acid in Plasma	No. of Cases	Test Dose Excreted in the Urine					
		0.0–1.9%	2.0–9.9%	10.0–19.9%	20.0–29.9%	30.0–39.9%	40.0–49.9%
mg./100 cc.							
0.00–0.39	28	24	4	–	–	–	–
0.40–0.79	17	8	4	2	3	–	–
0.80–1.19	3	–	–	1	–	1	1
1.20–1.59	1	–	–	–	–	1	–
Totals	49	32	8	3	3	2	1

Examination of the Mouths

The mouths of the 86 children were examined by one of us (P. W. W.) in both autumn and spring. Examination did not reveal the markedly swollen, spongy or bleeding gums that are generally recognized as typical signs of frank scurvy, but a milder degree of inflammation of the gums was frequently observed.

Inflammation of the oral mucosa was observed most frequently on the labial aspect of the upper jaw, less frequently on the buccal aspects of the maxillas and the labial aspect of the mandible, and least frequently on the lingual and palatal aspects.

To stabilize the recording of oral inflammation and to make possible the detection of changes in the manifestation of the inflammatory reactions, standards for recording the extent of the inflammation were set up, and the inflammation was classified as slight, moderate or extensive.* When, as

*The cardinal signs of inflammation as manifested in the mouth were the determining factors in classifying the findings. Erythema was the commonest sign, and edema as manifested by swelling and a spongy feeling was nearly as frequent. The tumor of edema was distinguished from the firm-feeling swelling characteristic of hypertrophy and of hyperplasia. Questioning a child for pain proved to be unsatisfactory. No attempt was made to rate calor. The first symptom of oral inflammation, along with one or more of the points mentioned above, was the loss of the normal stippling on the surface of the epithelium, manifested by a smooth glossy appearance, with distinct high lights reflected.

If the inflammation was limited to the interdental papillae in the embrasures so that triangular regions of inflamed tissues were seen to be isolated from the affected tissues of an adjacent embrasure, the extent of inflammation was regarded as slight. The islands of oral inflammation presented themselves in the interdental papillae in any locality of the mouth.

If the inflammation progressed from the interdental papillae into the continuous mucous membrane covering the alveoli, so that the evidences of the reaction were found not only in the embrasure but also in the tissues of the crest of the ridge, it was regarded as moderate. In other words, the reaction had in these cases extended from the interdental papillae up into the mucous membrane covering the alveolar ridges so that the swollen tissues became contingent over the necks of the teeth. When the edematous tissues measured approximately 2 mm. in the direction of the long axis of the tooth, the limit of the moderate reaction was reached.

If the inflammation extended from the tips of the interdental papillae up into the mucous membrane covering the alveoli beyond the limits set for the moderate reaction so that the greater portion of the gum tissue was involved and the gums presented a marked inflammatory aspect, it was regarded as extensive.

Although this procedure was developed independently, it has many points of similarity with that of Hanke.[7]

often happened, the extent of the inflammation varied in different parts of the same mouth, the greatest extent present was chosen as the basis for classification. To permit later study, for each oral examination a detailed description of the condition of the entire mouth was written, and any dental caries observed was recorded on a chart.

Table 4 shows the distribution of the children according to the presence or absence of inflammation of the gums and the extent of inflammation.

TABLE 4. *Condition of Gums of 86 Children Examined Both in the Autumn and in the Spring.*

Condition of Gums	Autumn Examination		Spring Examination	
	No. of cases	Per cent	No. of cases	Per cent
No inflammation	54	63	42	49
Inflammation (all degrees)	32	37	44	51
Slight	17	20	28	33
Moderate	11	13	12	14
Extensive	4	5	4	5

TABLE 5. *Association between the Condition of the Gums in the Autumn and the Condition in the Spring.*

Condition of Gums in Autumn	No. of Cases	Condition of Gums in Spring: No Inflammation	Inflammation: Slight	Moderate	Extensive
No inflammation	54	35	15	3	1
Inflammation					
Slight	17	5	10	2	–
Moderate	11	1	3	6	1
Extensive	4	1	–	1	2
Totals	86	42	28	12	4

At the time of the autumn examination, slightly more than one third of the children had inflammation of the gums of some degree; in the spring about half had such inflammation. The extent of the inflammation was most frequently slight; slight inflammation was observed in 17, or 20 per cent, of the children in the autumn and was even commoner in the spring, when it was noted in 28, or 33 per cent. In both the autumn and the spring 13 or 14 per cent — 11 children in the autumn and 12 in the spring — had inflammation of moderate degree, and about 5 per cent (4 children) had extensive inflammation.

A comparison of the extent of inflammation noted in the 86 children in the autumn with that observed in the same children in the spring is shown in Table 5. Thirty-five (41 per cent) of the children were free from inflammation at both examinations. Twenty-five (29 per cent) who had inflamed gums in the autumn also had inflamed gums in the spring. In addition, 19 children (22 per cent) who had healthy gums in the autumn had developed inflammation by spring. Altogether, therefore, a total of 44 children, slightly more than half of the group, had inflamed gums at the time of the spring examination.

If vitamin C deficiency is a cause of the inflammation of the gums observed in these children, one would expect that inflammation would be found more frequently in children with low plasma-ascorbic acid values than in those with higher values. The comparison of the distribution of plasma-ascorbic acid values with the distribution of inflammation of the gums would be more satisfactory if it had been possible to make the examinations of the mouths in the autumn nearer the time of the blood examinations than was done in some cases. In the spring the two examinations in all cases were made within, at most, seven days of each other, but in the autumn in many cases there was an interval of fourteen to twenty-seven days (in a few cases twenty-eight to thirty days) between the two examinations, so that it is possible that the state of vitamin C nutrition of some of the children may have changed in the interval.

TABLE 6. *Association between the Value of Ascorbic Acid in the Blood Plasma and the Condition of the Gums.*

Condition of Gums	No. of Cases	Ascorbic Acid in Plasma: Below 0.40 mg. in autumn and spring	0.40 mg. or above in autumn and below 0.40 mg. in spring	Below 0.40 mg. in autumn and 0.40 mg. or above in spring	0.40 mg. or above in autumn and spring
Inflammation in autumn and spring	25	11	7	4	3
Inflammation in spring but not in autumn	19	7	4	5	3
Inflammation in autumn but not in spring	7	3	3	–	1
No inflammation in autumn and spring	35	3	16	6	10
Totals	86	24	30	15	17

There is, nevertheless, evidence of an association between the presence of inflammation of the gums and low plasma-ascorbic acid levels.

In Table 6 the children are classified in four groups: those who had low plasma-ascorbic acid values (below 0.40 mg. per 100 cc.) in both the autumn and spring; those who had values of 0.40 mg. or above in the autumn but low values in the

spring; those who had low values in the autumn but high values in the spring; and those who had values of 0.40 mg. or above at both examinations. For each of these groups are shown the number of children who had inflammation of the gums at both examinations, the number who had inflammation in the spring but not in autumn, the number who had inflammation in the autumn but not in spring, and the number who were free from inflammation at both examinations.

If an association exists between the level of ascorbic acid in the plasma and the presence or absence of inflammation of the gums, this should be best demonstrated by a comparison of the frequency with which inflammation was observed to be present or absent at both examinations in the two groups that offer the sharpest contrast in terms of plasma-ascorbic acid levels, namely, the 24 children who had low values in both autumn and spring, and the 17 children who had high values at both examinations. These groups are small, but they are fairly clear-cut in terms of plasma-ascorbic acid values. Of the 24 children with consistently low ascorbic acid values in both the autumn and spring, only 3 children were free from inflammation of the gums at both examinations; of the 17 children with consistently high ascorbic acid values, 10, or 59 per cent, were entirely free from inflammation. Inflammation was observed both in autumn and in spring in 11, or nearly half, of the children with low ascorbic acid values, and in only 3, or not quite one sixth, of those with high values.

Effect of Vitamin C Therapy on Inflammation of the Gums

To obtain further evidence of the apparent association between vitamin C undernutrition and inflammation of the gums, a therapeutic test with vitamin C was given in the spring to 41 children who showed such inflammation. Twenty-six were from the group of 86 examined in both the autumn and the spring who could best be depended on to co-operate in the test, and 15 were other children who had inflamed gums. Table 7 shows the association between the mouth findings before and after therapy. Six children showed extensive, 19 moderate and 16 slight inflammation at the beginning of the test. Each child was supplied with tablets containing 50 mg. of crystalline ascorbic acid, with instructions to take 4 tablets daily. Between nineteen and twenty-one days after the therapy was started, the mouths were re-examined. Twenty-eight, or about two thirds, of the 41 children showed improvement in the condition of the gums, and 13 of these were free from inflammation. In 13, or about one third of the children, the extent of the inflammation was unchanged after therapy. No child showed an increase in the extent of the inflammation.

TABLE 7. *Extent of Inflammation of the Gums before and after Vitamin C Therapy Given to 41 Children.*

Extent of Inflammation before Therapy	No. of Cases	Extent of Inflammation after Therapy			
		None	Slight	Moderate	Extensive
Slight	16	8	8	–	–
Moderate	19	5	12	2	–
Extensive	6	–	2	1	3
Totals	41	13	22	3	3

Since inflammation of the gums was observed more frequently in children with consistently low plasma-ascorbic acid values than in those with consistently high values, and since improvement in the extent of the inflammation was observed within only three weeks in approximately two thirds of the 41 children who were given vitamin C therapy, it may be concluded that vitamin C undernutrition is in all probability an important factor in the causation of this type of inflammation.

The observation of inflammation of the gums in 44, or slightly more than half the children, examined in both the autumn and spring (the 25 who had inflammation of the gums at both examinations and the additional 19 who had developed inflammation by spring) suggests that there was a high incidence of vitamin C undernutrition in the group.

Evaluation of Diets

Information obtained concerning the diets of a number of children in the school (76 in the autumn, 63 in the spring) showed that during both autumn and spring very few of the children ate foods that are sources of vitamin C frequently enough to provide an adequate intake of the vitamin. A good source of vitamin C* was eaten with an average frequency of once daily by not more than one child in seven at either season. At least half the children (43 of 76 in the autumn, and 32 of 63 in the spring) did not eat even a fair source of the vitamin, other than potato, oftener than once a day, and about one sixth (14 in the autumn, and 10 in the spring) did not eat such a food more than twice during the week for which diet records were kept. A detailed study of the diets and of the vitamin C content of the foods commonly used is to be published separately.[8]

Comments

It is recognized that there are certain limitations in the information regarding vitamin C nutrition

*Foods considered good sources of vitamin C were citrus fruits, tomato, cabbage and turnip (rutabaga).

that can be obtained from a single determination of plasma-ascorbic acid value. The level of ascorbic acid in the blood is apparently influenced much more rapidly by variations in the vitamin C intake than the stores of the vitamin in the tissues are. The error from this source is probably less, however, in the study of a group than in the study of the individual, since in a group there is the possibility that a variation from the usual diet in one subject will be counterbalanced by a variation in the opposite direction in another subject. In the present study the results have been further stabilized by basing the conclusions on two determinations of plasma ascorbic acid on each child, with a considerable time interval between the determinations.

The comparison of the results of the urinary tolerance test with the results of the determination of the plasma-ascorbic acid level indicates that, although there may be a few cases in which the results of the two tests give somewhat contradictory evidence of the state of vitamin C nutrition, the general picture presented for a group of children is much the same in both tests.

The possibility has been pointed out that for some of the children the plasma-ascorbic acid values obtained may have been influenced by foods containing vitamin C that were eaten on the day of the test. In the spring it is also possible that some of the children had had an unusual amount of citrus fruit in their diets during the few days immediately preceding their tests, because the Federal Surplus Commodities Corporation had distributed grapefruit to the families of about half the 86 children two days after the time at which the examinations were started. In either event the results obtained from the tests would be unduly high and would result in underestimation rather than overestimation of the prevalence of vitamin C undernutrition in this group of children.

The comparison of plasma-ascorbic acid values with mouth findings has shown that inflammation of the gums was present more frequently in children who had consistently low levels of ascorbic acid in the plasma than in those who had higher levels. It is to be expected that there would be cases in which inflammation of the gums was present and the plasma-ascorbic acid level was not low, and conversely, cases with low plasma-ascorbic acid values and no inflammation, since the inflammation, if due to vitamin C deficiency, is probably the result of a long-continued deficiency, whereas the plasma-ascorbic acid value may be temporarily higher or lower than the usual level as a result of recent variations from the ordinary diet. Individual exceptions, therefore, do not detract from the evidence of an association between inflammation of the gums and low plasma-ascorbic acid values. This evidence is materially strengthened by the improvement in the condition of the gums observed in two thirds of the children given a therapeutic test over a short period. Although deficiency of vitamin C appears to be an important causative factor in the production of inflammation of the gums of the type observed, there is no evidence that it is the only factor. It may well be that other conditions, such as poor mouth hygiene and other types of nutritional deficiency, also play a part in the production.

Since it was found in the autumn and again in the spring that about 55 per cent of 86 children had plasma-ascorbic acid values that are usually associated with vitamin C undernutrition, and that inflammation of the gums, probably due in part at least to vitamin C deficiency, was noted in about 51 per cent (both in autumn and in spring in approximately 29 per cent of the children and in the spring alone in an additional group of about 22 per cent), it appears that a considerable number of the children in this group were vitamin C deficient during that part of the year when relatively few home-grown fruits and vegetables are available. That many more of these children were probably on the borderline of inadequate vitamin C nutrition is indicated by the finding that only 2 had plasma-ascorbic acid values at both examinations that are considered to indicate adequate vitamin C intake, and that at neither examination did more than about 15 per cent of the children have such values. These findings do not, of course, give any information of the vitamin C level during those months of the year when home-grown fruits and vegetables are relatively plentiful.

The frequent finding of inflammation of the gums in these children and the evidence that this inflammation is associated with vitamin C undernutrition seem to indicate that for many of the children in the group there had been a deficiency in vitamin C intake sufficient to cause recognizable impairment of physical well-being.

Summary

A study of the status with respect to vitamin C nutrition of a group of 86 children chiefly of French-Canadian extraction, attending an elementary school in a Maine village, was made during those months of the year when relatively few home-grown fruits and vegetables are available. The results of this study indicate that a considerable number of these children were undernourished with respect to vitamin C, as is shown by the following findings.

Examination of the blood showed that of the 86 children, 55 per cent had relatively low values

(less than 0.40 mg. per 100 cc.) for vitamin C in the blood plasma. Twenty-eight per cent had low values both in autumn and in spring, and 27 per cent had slightly higher values (0.40 to 0.79 mg.) in the autumn but low values in the spring. Such low values have usually been found to be associated with vitamin C undernutrition. Only 2 of the children had values that were high enough both in autumn and in spring to be considered evidence of adequate vitamin C intake (0.80 mg. or above). A comparison of plasma-ascorbic acid values with the results of urinary tests for vitamin C tolerance in 49 children lends support to the reliability of plasma-ascorbic acid values as an indication of the state of vitamin C nutrition.

Examination of the mouths of the same 86 children showed that the 29 per cent who had some degree of inflammation of the gums in the autumn also had some degree of inflammation in the spring, and about 51 per cent (an additional 22 per cent) had inflamed gums in the spring. This inflammation was found to be more frequent in children with consistently low values (less than 0.40 mg. per 100 cc.) for plasma ascorbic acid than in those with consistently high values, and the condition was observed to improve in approximately two thirds of 41 children with inflamed gums who were given vitamin C therapy for three weeks. Vitamin C deficiency, therefore, appeared to be a factor in the production of the inflammation of the gums observed in these children.

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MEDICAL PROGRESS

TREATMENT OF BILIARY-TRACT DISEASE

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SUCCESSFUL treatment of biliary-tract disease resolves itself essentially into an attempt to safeguard known physiologic functions or to replace such functions as have been lost or temporarily disturbed. Except for strictly surgical procedures directed at the removal or drainage of focal infection in the biliary tract, such physiologic considerations are of primary therapeutic importance and form the basis of successful surgical, as well as medical, maneuvers. The treatment of serious intrahepatic disease is by no means the forlorn hope that it was formerly thought to be. A reasonable optimism is becoming increasingly evident in the treatment of hepatic disorders, owing to the knowledge that more or less specific remedial measures exist that if properly applied may at least restore a fair degree of function, even if a complete cure is not possible. The regenerative powers of the liver are well known, and it is essential to recognize the reason for such optimism, which is based on the more recent knowledge available concerning measures designed to supplement or replace many of the multiple functions of this organ. It is also important to differentiate measures that are strictly protective against damage to the liver and those that are effective in aiding repair once damage has been produced by one or another noxious agent.

Avoidance of specific toxins still constitutes a fundamental approach to the problem of liver disease, and reference may justifiably be made to various reports of liver damage due to substances encountered in the routine treatment of other diseases or to industrial hazards. In spite of its well-known toxicity, chloroform continues to be a source of hepatic damage. An interesting article is that by Townsend,[1] who reports 2 cases of acute yellow atrophy following the administration of chloroform in pregnancy. Of particular importance is the fact that in each case the toxic effects of the anesthetic were in all probability enhanced by starvation and dehydration secondary to prolonged vomiting, prior to the administration of the drug. The untoward effect on the liver of a too-enthusiastic use of the barbiturates is not generally recognized, and an article by Scheifley and Higgins[2] properly directs attention to the toxic

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effect of these drugs in the presence of liver damage. These authors studied the effect of several preparations used as hypnotics or as anesthetics in the presence of partially hepatectomized animals, and their findings strongly suggest that the intact liver is necessary in protecting against the action of pentobarbital sodium (Nembutal) and ethyl-o-ethylphenylurea. These and similar findings may well explain many of the unpleasant and sometimes serious disturbances occurring after the use of excessive amounts of such preparations in depleted patients or in patients suffering from biliary-tract disease.

A renewal of interest in the use of acacia as a means of maintaining normal plasma osmotic pressure relations makes it important to call attention to recent experimental work with this material. Among other articles, one by Hall, Gibson and Weed[3] shows that the intravenous administration of gum acacia in dogs resulted in evident interference with the carbohydrate and serum-protein functions of the liver as evidenced by changes in the tolerance curves of glucose and galactose and by a fall in the plasma fibrinogen content. The bleeding time was prolonged, and it was noted that blood clots were small and fragile. Such findings confirm the observations of previous investigators that gum acacia may cause serious damage to the parenchymal cells of the liver and that its therapeutic use warrants careful scrutiny. The use of thorium dioxide in diagnosis has been subjected to criticism for some time. The report of Jacobson and Rosenbaum[4] of a case in which the liver was examined five years after injection of the drug demonstrates its probable deleterious effects on the liver. Further confirmation is found in a study by Pohle and Ritchie,[5] who examined microscopically the livers of dogs killed two years after the injection of Thorotrast. X-ray films taken at intervals during the period of observation showed no appreciable loss of density of the liver and spleen, and histologically there was hydropic degeneration of the liver cells. The findings were less in degree than those noted by other observers in rabbit experiments, but the authors properly considered the use of thorium for visualization of the liver and spleen in human beings to be definitely restricted to those cases in which the ultimate outcome is problematical.

The widespread use of sulfonamide preparations warrants a discussion of the possible toxic effect of such drugs on the liver. Van Winkle and Cutting[6] in experiments in cats have demonstrated that the acetylation of sulfanilamide takes place fundamentally in the liver and spleen. Sulfapyridine is also acetylated in large part by the liver. In the hepatectomized rabbit the acetylation of sulfanilamide does not occur. The finding of a direct van den Bergh reaction in certain cases of jaundice following the use of sulfanilamide seems to indicate direct damage to the liver.[7] Although certain authors like Schmidt[8] consider that sulfanilamide is not a hepatic poison, continued reports by most observers[9–15] seem to produce incontrovertible evidence that the use of this drug can at times cause serious and even fatal liver disease. The unfortunate failure to consider seriously the dangers inherent in the prolonged and uncontrolled administration of sulfanilamide or Neoprontosil is evident in Russell's[16] report of a case of acute toxic necrosis of the liver in which fatal liver damage occurred during prolonged treatment of a gonorrheal infection. Inasmuch as gonorrhea rarely if ever produces important hepatic changes, the unfortunate results obtained in this case may probably be laid to chemotherapy. It is obvious from these and similar reports that a continued recognition of the dangers inherent in the administration of sulfonamide compounds is warranted. Of this group, sulfanilamide to date seems to be the most dangerous in potential damage to the liver.

The occurrence of jaundice during antisyphilitic treatment constitutes a well-known complication of the modern therapy of this disease, although a real doubt still exists in the minds of many physicians concerning the hepatotoxic effects of the arsenicals. An excellent critical review of this subject is presented by Rankin and Marlow,[17] who studied in great detail a series of 62 patients, in all of whom jaundice developed during the course of antisyphilitic treatment with arsenic. The authors conclude that subclinical residual liver damage appears to be present after recovery from postarsphenamine jaundice. In itself postarsphenamine hepatitis is not indicative of a poor prognosis. Alcoholic addiction or the continuation of arsenical therapy in the presence of otherwise static liver damage secondary to the use of the drug is probably hazardous. In certain cases, even after the disappearance of jaundice, it is of interest that the authors demonstrated an increased bilirubin retention and an apparent increase in the size of the liver in association with further arsenical treatment. The statement that patients recovering from "arsenical jaundice" should not use alcohol is confirmed by many examples in my experience and is a point that has not been sufficiently recognized. The article is critically written and is well worth reading. Further proof that postarsphenamine jaundice is an important entity is to be found in an article by Hanger and

Gutman.[18] In most of the 92 patients studied the jaundice appeared to be of the hepatogenous type, as indicated by such laboratory studies as the determination of serum phosphatase, cephlin flocculation and cholesterol esters. The unusual findings indicative of an obstructive type of jaundice with a high phosphatase, normal flocculation and a normal hippuric acid excretion were observed in 12 cases. Proof of the obstructive nature of the disturbance in 4 patients was obtained by punch biopsies of the liver; the lesion in each consisted of inflammatory changes in the finer biliary radicals and bile thrombi in the terminal ducts, without marked changes in the liver parenchyma. Recovery occurred in these 12 patients, but there can be little doubt that these studies indicate a hitherto unsuspected type of hepatic damage caused by arsenic. Further evidence of the occasional dangers of antisyphilitic therapy can be found in the report by Wolman[19] of 2 cases of acute hepatic necrosis in infants following the use of sodium bismuth thioglycollate. The author rightly condemns indiscriminate antisyphilitic treatment of infants born of syphilitic mothers. In each of the above fatal cases such treatment was carried out before signs of congenital disease had become evident.

The direct toxic effect of alcohol on the liver in the absence of other conditioning factors remains a controversial question. In my mind there is little doubt that clinically alcohol causes a serious disturbance of liver function and in all probability organic damage to the hepatic parenchyma in the presence of already existing disease of infectious or toxic origin. In the absence of pre-existing liver disease, there is still doubt of the exact effect of alcohol on the hepatic cell. For this reason an article by Newman et al.[20] is of distinct interest. These authors compare the effects of various glycols with that of ethyl alcohol, and show that the latter was metabolized directly by the liver and exerted a depressing effect on its functional activity as indicated by a decrease in oxygen consumption, an increase in blood lactic acid and a decrease in liver glycogen of as much as 45 per cent. Incidentally, it appeared that propylene glycol was the least injurious and objectionable of several glycols used as solvents. It is of interest to note that the addition of insulin to propylene glycol appeared definitely to decrease the oxygen consumption in the liver, and probably to diminish optimal hepatic activity. Connor's[21] pathological study of so-called "alcoholic cirrhosis" should be mentioned. He reviews in detail studies of livers obtained from 47 chronic alcoholic patients, and presents a clear macroscopic and microscopic picture of the two important phases of alcoholic cirrhosis: that associated with marked fatty enlargement of the organ with hyaline degeneration and atrophy of the peripheral cells associated with early fibrosis, and the later stage characterized particularly by proliferation of connective tissue and the typical picture of portal cirrhosis. Regardless of the fact that other factors, such as deficiency in specific food substances, undoubtedly condition the production of hepatic changes noted in chronic alcoholic patients, the importance of the effect of alcohol on the liver under certain conditions cannot reasonably be underestimated.

Cinchophen continues to contribute cases of fatal liver injury in spite of the fairly voluminous literature regarding its dangers. The cases reported by MacBryde[22] constitute a warning that is still timely.

The use in industry of various solvents continues to add to the knowledge of poisons that may cause severe liver injury. A case of subacute yellow atrophy following exposure to a petroleum distillate known as "Stoddard's solvent," similar to benzine, is presented by Braunstein.[23] The case is important because of the infrequency with which petroleum products appear as causes of liver disorders. A potential hazard may also be mentioned, namely, that suggested by a recent editorial[24] on dangers associated with the operation of submarines. Arsine or arseniuretted hydrogen has long been known as a means of producing experimental liver injury. This gas is highly toxic in animals and in human beings, and may under certain conditions be present in submarines.

A fairly common cause of liver damage frequently escapes consideration from this particular angle, namely, the hepatic damage following severe burns. Serious burns are usually and properly considered in relation to the associated loss of fluids, electrolytes and plasma proteins. Structural changes may occur in the liver following burns, as noted in the report by Belt,[25] who compares the lesions to those observed in virus diseases such as yellow fever. There was widespread midzonal necrosis. The degree of cytoplasmic degeneration noted would amply explain the various changes, found by Wolff and his collaborators,[26] on bilirubinemia, bromsulfalein retention, hippuric acid formation, plasmaprothrombin changes and dextrose-tolerance modifications seen in 3 patients. Whether these hepatic changes are due to a toxin derived from the burned area, anoxia associated with local capillary stasis, or infection cannot be stated; but it is obvious that the usual measures for treating acute liver insufficiency are indicated once the loss of plasma

protein and electrolytes has been adjusted. Such measures are of even greater importance when one considers that the restoration of plasma-protein deficits is extremely inadequate in the presence of liver failure.

To those readers interested in experimental production of liver damage by unusual agents, the reports on animal experiments on the use of such widely unrelated substances as the seeds of yellow burweed,[27] wheat from seleniferous soil,[28] dibenzanthracene[29] and butter-yellow[30] (*p*-dimethylaminoazobenzene) may be recommended. Of particular significance is the finding that the striking cirrhotic changes produced in rats by the use of butter-yellow were entirely reversible on withdrawal of the poison, even after the material had been administered for as long as eight months. Such restoration of hepatic parenchymatous changes to normal after prolonged intoxication provides adequate evidence of the importance of maintaining an optimistic attitude even in the treatment of chronic liver disease.

The importance of dietary measures in the treatment of liver disease is fairly well recognized, but such measures are not yet universally practiced. Experimental and clinical observations have long shown that an adequate supply of easily utilizable carbohydrates is essential for the protection of the liver against various toxins and probably for a restoration of normal hepatic function in the face of existing liver injury. Soskin and Hyman[31] summarize the rationale of intensive dextrose therapy in diseases of the liver, particularly after damage has occurred from various toxic agents. The mechanism by which benefit is derived from intensive glucose therapy is still not thoroughly understood, but the fact that many toxic substances are excreted as glycuronates suggests that excessive stores of carbohydrates favor detoxification. An important point made by these authors is that the routine use of insulin in connection with dextrose therapy should be avoided unless the patient also has diabetes. In view of recent articles favoring the use of insulin in association with the treatment of acute hepatic damage, it is important to consider that this drug may defeat the very purpose for which dextrose is administered. The suggestion that insulin is contraindicated under such circumstances is also found in the article already referred to by Newman and his collaborators,[20] who show that the addition of insulin to propylene glycol inhibits normal hepatic-cell function, and by the even more important studies of Stadie, Lukens, and Zapp[32] on the effect of insulin on liver metabolism. The recent studies of Miller and Whipple,[33] Ravdin[34, 35] and others indicate clearly that an adequate protein intake is important for proper regeneration following liver injury and for protection against potential liver toxins. That an adequate supply of carbohydrates is also essential and in some cases is of even greater importance is suggested by the studies of Bollman, Butt and Snell.[36] These authors caused extensive hepatic damage in rats by the use of carbon tetrachloride. The extensive hepatic necrosis appeared greatest in animals on a low-protein diet and least in those on a high-carbohydrate diet, whereas *regenerative* changes were more marked in animals on a high-protein intake. No correlation could be demonstrated between the amount of hepatic necrosis and the amount of prothrombin in the blood, but it is important to note that animals on high-carbohydrate diets survived without hemorrhage about half again as long as animals on either high-protein or high-fat diets.

The importance of an adequate protein intake in protecting the liver against damage has been well demonstrated by Ravdin and his collaborators.[34, 35] These investigators showed that the damage from chloroform is independent of the glycogen content of the liver cells, increases progressively with an increase in concentration of hepatic lipids and is minimal when chloroform anesthesia has been preceded by a high-protein diet. They also showed that in the presence of experimental common-duct obstruction a diet high in protein and carbohydrate and containing no fat was found most effective in reducing the fatty-acid concentration of the liver and in increasing hepatic glycogen. This diet gave approximately the same result as the usual high-carbohydrate diet but in half the time. Miller and Whipple[33] likewise showed that protein depletion followed by chloroform anesthesia produced serious hepatic damage, whereas four to five times as much of the anesthetic could be tolerated with but little liver injury in the absence of protein deficiency. Messinger and Hawkins[37] demonstrated that dogs were protected from hepatic damage by arsphenamine if fed an adequate protein diet. They stated that repair occurred more promptly on such a diet than on any other regime. A high-carbohydrate diet was not so uniformly protective. They also stressed the important fact that in animals protected from the toxic effects of arsphenamine by a high-protein or high-carbohydrate diet there was a progressive increase in the icteric index when the diet was changed to one high in fat, even though no additional arsphenamine was added. When fat-fed dogs, showing severe intoxication, were changed to high-protein or high-carbohydrate diets, they immediately recovered from the intoxicated state, and the icteric index decreased. These observations are entirely in keeping with my experi-

ences in the treatment of arsphenamine jaundice and other forms of acute or subacute liver injury. For practical purposes, however, the use of high-protein diets offers real difficulties when applied to patients with serious acute hepatic insufficiency. These patients are frequently incapable of eating anything but the simplest foods, and are often incapable of receiving an adequate intake by mouth. Under such circumstances, in the presence of existing serious liver damage, the immediate therapeutic indication is for adequate intravenous glucose therapy, supplemented by whole-blood or plasma transfusions. When it becomes possible to administer specific proteins intravenously, a very important contribution will have been made to our therapeutic armamentarium. On the other hand, in cases in which potential liver damage is present, such as in the course of antisyphilitic treatment, or in cases in which liver damage is of only moderate degree, there can be little doubt that the emphasis placed by Whipple, Ravdin and others on the importance of an adequate protein intake is of the utmost consequence from the point of view of probable protection against further damage, regeneration of hepatic cells, possibly more adequate gluconeogenesis and a better maintenance of plasma-protein relations. At the present time, liver and milk (casein) seem to be the most valuable forms of protein that are available.

When damage to liver cells has been checked and recovery is well under way, provided the original cause of hepatic disturbance has been removed, it is highly probable that the addition of fat to the diet in reasonable amounts is indicated. This is suggested by the observations of Machella, Higgins and Mann,[38] who showed that in partially hepatectomized animals the apparently greater degree of hepatic restoration under forced feeding was to a certain extent due to an accumulation of fat in the hepatic cells. Crandall, Ivy and Ehni[39] also suggested, as a result of their studies on hepatic acetone-body production during fasting and fat feeding, that ketogenesis may be a mechanism for supplying the tissues with substances that can be used to replace partially the role of glucose in conserving carbohydrate reserve and decreasing the need for gluconeogenesis. In other words, for protection against liver damage a diet high in protein and carbohydrate and extremely low or lacking in fat is indicated. For aiding the liver in recovery from existing damage a diet that is very high in carbohydrate and as high as possible in protein should be chosen. Once the original cause of the trouble has been removed and recovery is fully under way, a high-calorie diet including reasonable amounts of fat may provide optimal conditions for maximum recovery.

Further convincing evidence of the importance of an adequate diet as a protection against liver damage has been presented by various investigators. György and Goldblatt[40] report the occurrence of widespread hepatic necrosis in rats kept on a diet lacking in vitamin B_2 or some other part of the B complex contained in yeast, and vonGlahn and Flinn[41] found definite evidence of protection against arsenical liver injury by the addition of brewer's yeast to the diet. The latter noted that the amount of hepatic glycogen bore no relation to the degree of liver damage produced by arsenic, a finding also noted in Ravdin's experiments. Rich and Hamilton[42] observed the development of cirrhosis of the liver in all of 14 rabbits kept on diets supplemented by various vitamins but lacking yeast. It is of interest that ascites occurred in 7 of the animals and also that microscopic, formed gallstones were found in intrahepatic bile ducts in several. These authors conclude that the lack of some factor exclusive of vitamins B_1, B_2, and B_6 and nicotinic acid, but contained in yeast, was responsible for the development of the hepatic lesions. The findings of Lauber and Bersin[43] contributed similar information concerning the protection afforded the liver by certain specific vitamins. During ether anesthesia the content of liver glycogen in the rabbit was noted to fall to 50 per cent of the preanesthetic level. When vitamin B_1 was administered several days previous to anesthesia, there was only a 10 to 15 per cent reduction in hepatic glycogen; and similarly, when vitamin A or vitamin D in adequate doses was administered for three days prior to ether narcosis, there was only a 15 to 20 per cent glycogen loss. The administration of vitamins B_2 and C did not influence the loss of glycogen from the liver cells.

Vitamin A deficiency has been noted by various observers in the presence of chronic liver disease, and obviously substitution therapy in replacing vitamin A lack in patients with cirrhosis and other chronic forms of hepatic disorders is indicated. Under these circumstances the administration of vitamin A is primarily aimed at correcting the symptoms of a specific vitamin insufficiency rather than protecting the liver from damage. Such a vitamin A lack may be due either to faulty absorption because of the relative lack of bile acids entering the small intestine or to an inadequate dietary intake, and is entirely comparable to similar deficiencies in other fat-soluble vitamins commonly observed in the course of hepatic disturbances. It is possible that a similar lack of vitamin D absorption in the presence of an inadequate intake or delivery of bile salts into the duodenum

may underlie the occasional incidence of pronounced osteoporosis and calcium deficiency observed in chronically jaundiced persons.[44, 45] Under such circumstances it is obvious that the intensive use of bile acids in addition to an adequate intake of vitamin D and calcium is essential to correct the underlying osseous disturbance.

The obvious importance of a proper understanding of the relation between deficiency in another fat-soluble vitamin, vitamin K, and hepatic function is clearly shown in the numerous articles that have appeared on this subject in the last five years. Although vitamin K lack may occur in any condition in which profound nutritional disease exists, its particular interest lies in its effect on prothrombin deficiency and the tendency to spontaneous bleeding commonly observed in patients suffering from serious disease of the liver. Although in most cases such a condition can be corrected by the administration of adequate amounts of vitamin K, it is of the utmost consequence to remember that serious intrahepatic disease itself may interfere with adequate utilization of this vitamin and the subsequent restoration of prothrombin to normal. An inadequate response to vitamin K therapy in itself indicates liver damage of the most serious degree, and in the occasional case when the administration of vitamin K is ineffective it should be remembered that multiple frequent transfusions may still temporarily control an otherwise fatal bleeding tendency. The role of the liver in the utilization of vitamin K is borne out by numerous articles, experimental and clinical.[46–49] That there may be a variable response to vitamin K therapy in a given person is suggested by the report of Ferguson and Calder.[50] These authors noted that in a patient suffering from a complete biliary fistula of four years' duration, in spite of the administration of constantly increasing amounts of a vitamin K preparation and bile salts by mouth, there were marked variations in the plasma prothrombin, the Ivy bleeding time and the serum-volume index. Although there was a marked initial rise in prothrombin following five days of intensive therapy, thereafter there was an abrupt fall in spite of intensive treatment. Normal figures were not obtained until surgical anastomosis had been performed between the common duct and the duodenum. Postoperative bleeding probably was avoided by the use of multiple transfusions immediately before and after surgical intervention. In this and similar cases of prolonged biliary fistula it is quite probable that disturbances in blood coagulation are due not only to a lack of absorption of vitamin K but also to the loss of valuable constituents on the drainage bile. It is also possible that in this type of case the parenteral use of synthetic vitamin K (2-methyl-1, 4-naphthoquinone) is the only desirable method of administration. For practical purposes it is highly probable that correction of hypoprothrombinemia will in the future be obtained most satisfactorily by such parenteral medication.[51–53] Finally, it is important to point out that as a precautionary measure the administration of vitamin K may be a proper preoperative procedure in any form of biliary-tract surgery in which prolonged vomiting or other cause of malnutrition has been present, even if there is no existing demonstrable disease of the liver or diversion of bile from the intestinal tract.

Attempts to affect choleresis by dietary measures or by the use of bile-salt preparations continue to attract attention. The oral administration of oleic acid was noted to stimulate the flow of bile, and the combination of bile salts and oleic acid produced a choleretic effect beyond the additive effects of each of these stimulative agents.[54] The administration of olive oil, however, produced no such effect. A series of careful investigations on choleresis and the composition of bile has been carried out by Berman, Ivy and their collaborators[55–58] on bile fistulas in dogs. Bile salts containing no cholesterol, when administered orally or intravenously, increase the cholesterol content of the bile. Further experiments were carried out using three types of bile-acid preparations: unoxidized, conjugated bile acids, as represented by the salts of glycholic and taurocholic acids found naturally in ox bile (Bilron, Fel Bovis); oxidized, conjugated bile acids, as represented by Dech-acid; and oxidized, unconjugated bile acids, as represented by Ketochol and Kebilac, which contain a mixture of mono-, di- and tri-ketocholanic acids, chiefly the last, and by Decholin, which is practically pure tri-ketocholanic acid or dehydrocholic acid. The conclusions drawn by these investigators are convincing and important. They believe that, if one desires to flush the bile ducts with "thin" bile, the use of one of the oxidized, unconjugated preparations of dehydrocholic acid or ketocholanic acid is indicated. If it is desired to increase the output of the bile of the liver and at the same time to increase its concentration in those bile salts naturally predominating in human bile, the use of a preparation of "natural" bile salts is to be advocated. The authors point out the very important fact that the presence of bile pigment in the feces does not necessarily indicate that bile salts are being excreted in the bile. The liver may excrete pigment when it does not form and excrete bile salts. Bile salts

can be used with the hope of counteracting a tendency toward stasis; but, to obtain a maximum effect, the patient must have a liver that will excrete bile salts. The authors are skeptical of the value of bile-salt therapy in the presence of hepatitis or during recovery from obstruction, except for the purpose of improving intestinal absorption. Of some additional interest is their finding that intensive bile-salt therapy over long periods produces no evidence of liver or kidney damage. It is known that this treatment increases the secretion pressure of bile, and therefore the intraductal pressure. Best, Hicken and Finlayson[59] make the important point that the continued use of bile salts results in a sharp rise in intraductal pressure, followed not infrequently by a drop to a level rather close to normal. If, therefore, the administration of bile salts is to be considered as a therapeutic measure to effect the expulsion of calculi from the common duct, optimum changes in intraductal pressure can be obtained only by the intensive use of bile-salt preparations over short periods.

The etiology of infectious jaundice (so-called "catarrhal jaundice") is still undetermined. Increasing evidence is appearing that in all probability this common condition is due to a filterable virus. Findlay's observations[60, 61] in this regard are extremely interesting. This author remarks that on more than one occasion laboratory workers have contracted the disease when working with the serums of infected persons. During the course of yellow-fever immunizations over a period of two years, 96 cases of jaundice occurred two to three months after inoculation, and in a fatal case subacute necrosis of the liver was found. Convincing proof was obtained that the jaundice was not due to the virus of yellow fever. The first proof that postinoculation jaundice could give rise to infectious jaundice was obtained following the use of pooled convalescent measles serum. In one institution 7 children became jaundiced ten to twelve weeks after inoculation, and 3 died of acute liver necrosis. Two months later 2 contacts who had not been inoculated developed infectious hepatitis. In 1937 McNalty[62] reported that about 100 persons had developed infectious jaundice from this batch of pooled serum. Other similar experiences have been reported. Observation seems to indicate that the disease is spread by a droplet infection and has an incubation period of one month or more and an infectious period of one to ten days through the preicteric stage and three to five days in addition after the appearance of jaundice. In Denmark it has been suggested that it is identical with porcine hepatitis and may have been reproduced in human beings by the ingestion of infected pork. In this respect the report by Andersen and Tulinius[63] is of interest. In one case, porcine hepatitis was induced by feeding a pig with duodenal juice obtained from a patient with acute epidemic jaundice. A second animal was similarly infected by feeding the liver from a pig with acute jaundice. Examination of the livers in the two infected animals showed that the lesions were identical. Somewhat different conclusions concerning the mode of spread of infection are contained in an article by Norton,[64] who reports 23 cases occurring in a rather isolated mining community. The sanitation of the community was unsatisfactory; the only milk supply was from an unclean dairy selling raw milk. It was believed that the infection was spread by intimate contact, and possibly through the food or water supply. Satisfactory control was obtained by the application of measures similar to those used in the control of typhoid fever. The average incubation time was apparently thirty-one days. Weil's disease was excluded by appropriate laboratory tests. That such a virus infection could be spread either by droplet infection or by contamination of food is not unlikely, inasmuch as it has been shown that the virus of poliomyelitis can occasionally be demonstrated in the feces of infected persons as well as in nasopharyngeal secretions. The prophylactic measures necessary in this widespread condition are, therefore, obvious. That infectious jaundice may result in serious or even fatal liver injury is fairly well recognized, but the report of Kirshbaum and Popper[65] on 15 fatal cases points to the necessity of intensive and adequate treatment of liver insufficiency in this disease. In these cases death occurred before the actual development of atrophy of the liver. Of incidental interest is the important, but not generally recognized, clinical fact pointed out by Weir,[66] who reports 10 cases of atrophy and necrosis of the liver without jaundice.

Exact information of the cause of one type of biliary-tract disease, gallstones, is still lacking. There can be little doubt, however, that certain generally suspected factors play an important role in their formation. Carter and his collaborators[67, 68] on the basis of careful observation of clinical material point out definitely the important role of biliary stasis as a factor predisposing to the formation of gallstones. They consider that the cholesterol content of the gall bladder is not related to the cholesterol content of the blood, and that the bile-salt to cholesterol ratio of the bile varies greatly in all types of pathologic change in the gall bladder. They believe that stasis is of great importance in the formation of gallstones, but point out that other unknown factors must

be operative, inasmuch as the vast majority of the noncalculous gall bladders also showed evidence of stasis. These authors also comment on the finding that in many cases gallstone formation occurred without any associated evidence of infection or inflammation of the gall bladder. Riegel, Calder and Ravdin[69] produce similar evidence that no relation can be shown between the concentration of cholesterol in the blood and the concentration of cholesterol in gall-bladder bile. That the concentration of bile acid may not be the only factor in holding cholesterol in solution in the bile, thereby preventing the formation of cholesterol calculi, is suggested by the studies of Dolkart and his associates,[70] who add further evidence to previous observations that fatty acids in the bile are probably an important factor in holding cholesterol in solution. Further evidence concerning the factor of biliary stasis, due, for example, to temporary obstruction of the common duct such as may occur from intermittent spasm of the sphincter of Oddi or from reversed peristalsis in the duodenum, is presented in experiments of Bisgard and Baker,[71] who produced bile-pigment stones in goats as an indirect result of operative procedures on the common duct. A somewhat similar finding was observed by Aronson[72] in dog experiments. The latter observer noted that such concretions obtained experimentally consisted of calcium, cholesterol, bile pigment and a large amount of unidentified black material. In an analysis of a large number of mixed human gallstones he[73] identified a similar dark-black residue, which contained practically no inorganic material. He believed that it probably consisted of pyrrole derivatives, degradation products of the bile pigments. Such a finding is of much interest inasmuch as material entirely similar in appearance to that described by Aronson is commonly seen in specimens of bile obtained by duodenal drainage from patients with gallstones. A rather curious and interesting finding is that of Ivy and Goldman,[74] who showed by experiments that constipation, irritation of the colon or stimulation of various divisions of the splanchnic nerves may predispose to stasis of the biliary tract by decreasing bile formation and by increasing the resistance to the flow of bile through the sphincter of Oddi into the duodenum.

It is obvious from these observations and those of Rich and Hamilton[42] already alluded to, in which microscopic gallstones were observed in the finer biliary radicals as a result of vitamin B deficiency, that numerous factors enter into the causation of biliary calculi. To some extent, at any rate, prevention may be attempted by measures directed toward a diet adequate in all constituents, careful bowel hygiene and the avoidance of colonic irritation by excessive catharsis or pronounced constipation, the feeding of simple fats in all meals to bring about frequent, adequate emptying of the gall-bladder contents, and the intensive and rapid treatment of any infectious or toxic process involving the biliary tract that might alter the chemical constituents of the bile because of functional hepatic disturbances.

Any adequate consideration of surgery of the gall bladder is beyond the scope of this review. Certain impressions from clinical experience and from examination of the current literature may be mentioned. The successful treatment of acute cholecystitis, a condition that is nearly always due to obstruction of the outlet of the gall bladder by calculus, still represents a controversial problem. Although some surgeons, such as Glenn,[75] consider that acute cholecystitis, like acute appendicitis, requires operation as soon as the diagnosis is made, a large number of experienced operators continue to advise a more conservative management of this condition. Graham,[76] Fallis and McClure,[77] Berk,[78] Elkin[79] and others favor a postponement of surgical measures until sufficient time has elapsed to permit a restoration of fluid balance and the institution of measures designed to protect the liver against the damage incident to anesthesia, medication and the depletion associated with this condition. It is undoubtedly true that the growing awareness of the need of such optimal preoperative preparation constitutes one of the most important contributions to modern surgery. For the most part, there is general agreement that immediate surgery is indicated only when there is evidence of a rapid spread of infection, with signs of empyema or perforation of the gall bladder. A welcome note of surgical conservatism is found in the article by O'Donnell[80] on the rationale of cholecystectomy in the noncalculous gall bladder. He reports that a careful investigation of the results in approximately 7000 patients with chronic cholecystitis who were subjected to cholecystectomy shows that over a third are complete failures. He rightly suggests that the recurrence of symptoms in cholecystectomized persons, particularly when gallstones are not present at operation, warrants the inference that an incorrect preoperative diagnosis underlies the therapeutic failure. He, like Graham and others, is skeptical of the role played by the noncalculous gall bladder in the production of symptoms, even when moderate cholecystitis can be shown to exist. There can be little doubt that gall-bladder surgery in such cases provides an example of wishful thinking and that a more adequate study will fre-

quently demonstrate that symptoms are due to simple alterations of gastrointestinal function derived from faulty bowel habits, cathartic habits, peptic ulcer, colitis, hepatitis and urinary-tract disturbances. In this respect the rather ingenious observation of Verbrycke,[81] which indicates an unusual cause of right-upper-quadrant distress due to disease at the hepatic flexure, is of interest. A further judicious and rather unusual surgical comment is found in the article by Warren and Balch,[82] who discuss carcinoma of the gall bladder. There can be little doubt from the evidence provided by various articles that gallstones are present in nearly three quarters of such cases, but these authors draw what seem to be very proper conclusions; namely, that the number of patients with gallstones who develop carcinoma of the gall bladder is extremely small, and that the decision whether to operate in cases of gallstones with few or no symptoms should be governed by a consideration of the nonmalignant complications rather than by the risk of carcinoma of the gall bladder. A growing recognition of the fact that gallstones are not too infrequent in children is evidenced in the report by Seidler and Brakeley,[83] who report a case diagnosed by the usual methods. Their review of the literature indicates that at least 450 cases of cholelithiasis are already recorded in children under fifteen years of age.

Of importance in the diagnosis of cholelithiasis are the reports of Layne and Bergh[84] and Zollinger and Kevorkian.[85] The former have carried out a most instructive experimental study of pain in the human biliary tract induced by spasm of the sphincter of Oddi. By sudden distention of the common bile duct, pain similar to the biliary colic typical of common-duct stone was produced in 29 patients. It is of interest that these subjects experienced deep epigastric or right-upper-quadrant pain following such maneuvers, and in 11 cases there was an associated but delayed transmission of the pain to the right subscapular and interscapular area. In each patient, pain was associated with evidence of increased tension within the bile duct, probably secondary to the spasm of the sphincter of Oddi but not associated with any duodenal disturbance. As previously noted by Zollinger[86] in somewhat similar experiments, nausea was occasionally observed. The clinical study by Zollinger and Kevorkian showed that in 75 cases of common-duct stone slightly more than half the patients complained of right-upper-quadrant pain, 40 per cent of the group localized their pain in the epigastrium, 5 per cent had left-upper-quadrant pain, and two thirds of the group also had pain in the subscapular area. Such observations are obviously important in the diagnostic interpretation of symptoms. The latter article is also of interest in that a careful comparison is made of symptoms associated with common-duct stone and those in a large group of patients with carcinoma of the pancreas.

Those interested in evaluating various diagnostic tests directed toward an understanding of the degree or type of hepatic disturbance in cases of actual biliary-tract disease are referred to the appended bibliography, which includes many of the important recent articles. It is also suggested that two excellent articles by Snell[87] and Stewart[88] be consulted for additional discussion of physiologic measures designed to protect the liver from damage or to treat adequately symptoms due to existing hepatic insufficiency.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 27121

PRESENTATION OF CASE

A thirty-six-year-old clerk complained of dyspnea and precordial pain.

Two years previously the patient was first troubled with palpitation and pain in the left arm. Cardiac murmurs were heard at the time, and he had been in bed almost continuously since that date. He did not improve and had dyspnea on the slightest exertion, with cough and an occasional hemoptysis. Some months before observation, he began to suffer from attacks of left precordial pain, which radiated down the left arm and through to the shoulder blades. The pain lasted for about fifteen minutes, occurred at rest, often awakened him at night, and was at first viselike, finally dwindling to a sense of oppression. Nitroglycerin gave almost immediate relief. The patient had been given aminophyllin for the last four months, which altered the pain to mere precordial oppression. Three weeks prior to observation he caught a cold, and since that time his cough and dyspnea had increased and were accompanied by a feeling of abdominal fullness and nausea with the development of ankle edema. No definite history of rheumatic fever could be elicited. One sister was known to have rheumatic heart disease.

On examination the patient was poorly developed and poorly nourished, dyspneic on the slightest exertion or talking. The neck veins were engorged. The heart was enlarged, the left border of dullness being in the fifth interspace 2 cm. beyond the mid-clavicular line. A systolic murmur could be heard in the aortic area and was transmitted to the neck; there was an associated systolic thrill. Along the left sternal border there was a loud early diastolic murmur, and at the apex a faint systolic and a very loud rumbling presystolic murmur. The pulse was 90 and irregular, the blood pressure 125 systolic, 70 diastolic. A few rales were present at the lung bases. The abdomen was distended and the liver edge palpable two fingerbreadths below the costal margin. There was no definite edema, but slight clubbing of the fingers was noted.

An electrocardiogram showed a normal rhythm at a rate of 90. There was early inversion of the T waves in Leads 1 and 2 and slight inversion of the T waves in Lead 3. There was no abnormal axis deviation. The PR interval equaled 0.17 second, and the duration of the QRS complexes was 0.09 second.

The patient remained at home under the care of his physician and was given digitalis and aminophyllin, and, when necessary, nitroglycerin for pain; salyrgan on two occasions produced a good diuresis. Ten days after observation a pain of unusual severity developed in the lower back and was accompanied by marked dyspnea and cough. Morphine was ineffective, but nitroglycerin every half hour through the night gave appreciable relief. The next morning the patient ate breakfast at the table, and later his physician returned and administered salyrgan, but there was no response. Back pain and dyspnea were still present, and in the afternoon nausea developed coincident with a bowel movement; a few hours later he began to cough up blood. It was necessary for him to sit in a chair to get his breath, cough and hemoptysis persisted, and as the day wore on, the pain became so severe that he cried out in agony. It eased for a few hours, but returned in the evening, and the patient clutched his chest, obviously striving to suppress the cries that formed on his lips. Death occurred within an hour.

DIFFERENTIAL DIAGNOSIS

DR. HOWARD B. SPRAGUE: Apparently this is a case in which the patient was taken care of at home until he died, and the doctor was, I hope, puzzled about why he died, and secured an autopsy. I am equally puzzled. The patient gave no past history of rheumatic infection, heart disease or venereal disease. He had a short history of what was apparently cardiac failure, a total history of two years. He complained first of palpitation and pain of an anginal nature, dyspnea, which was severe, and hemoptysis. The pain radiated down the left arm and was relieved by nitroglycerin. It was relieved also by a drug of the xanthine series, which presumably acted as a coronary dilator.

The immediate present illness started in association with a respiratory infection, the cough and dyspnea increased, and the patient developed a little ankle edema. Examination showed an increase in venous pressure, a heart enlarged to the left, and a systolic murmur at the aortic area with a thrill, and a loud diastolic murmur along the left sternal border; it is stated that there was a very loud rumbling presystolic murmur at the apex and only a slight systolic. The rhythm of the heart, although it is described as irregular, at first appears to have been fundamentally normal from the electrocardiogram — presumably an irregularity due to premature beats. The patient had no edema at the time of this examination. He

had a slight amount of clubbing of the fingers, and a blood pressure that was not very striking in view of the description of the loud early diastolic murmur along the left sternal border; that is, the diastolic pressure was not markedly decreased. Many things that would make me more comfortable in diagnosing this type of cardiac lesion are missing from this record. The patient did not have all the investigation he might have had if he had been in the hospital, so that we have to interpolate. What, for example, was the quality of the first and second heart sounds? Was there a sharp first sound with an apical diastolic murmur? Was there a diminution or absence of the aortic second sound? Was there an accentuation of the pulmonary second sound? Was there any cyanosis?

Dr. Tracy B. Mallory: Dr. McGinn can answer some of these questions.

Dr. Sylvester McGinn: The sounds themselves were not striking. The aortic second sound was almost wiped out by an early blowing diastolic murmur. At the apex, there was a faint systolic, but primarily a presystolic rumble. P_2 was greater than A_2. The patient was not cyanotic. He had had a Hinton test in a period of hospitalization two years prior to this admission. It was negative.

Dr. Sprague: I judge that there was a diminution of the aortic second sound, but the murmur was essentially a two-way rough murmur with a systolic thrill. There was no x-ray examination of the heart and aorta, so far as we know. The only piece of laboratory evidence in the record is the electrocardiogram. It is a popular idea that this is the only piece of information that a cardiologist must have to make a complete diagnosis of cardiac lesion, as Sherlock Holmes could tell the way a man looked by discovering the kind of cigar ashes he left around, but I assure you it is not so with the cardiologist. What do we get out of the electrocardiogram? The tracings showed that the T waves were downwardly directed in all three Leads, and the record refers to an early inversion in Leads 1 and 2. It is not possible to see these tracings. I suppose that the electrocardiogram was taken after the patient had digitalis. The T wave changes could be consistent with digitalis effect in the electrocardiogram, and the fact that it was noted as an early inversion indicates to me a sagging of the ST segment and not a late inversion of the coronary type.

Dr. Mallory: Digitalis had been administered before the electrocardiogram, but the amount is not specified.

Dr. Sprague: Concerning the absence of any abnormal electrical deviation, if we were to assume that this was an aortic lesion, and what was heard at the apex was an Austin–Flint murmur, the picture would be one of left ventricular strain, and I should expect left-axis deviation. If, however, the patient had aortic and mitral lesions on a rheumatic basis, the strain on the two sides of the heart might well balance, so that there would be no disturbance in the electrical axis. The possible etiologic agents that come to mind are of course rheumatic fever and syphilis. There was no history of venereal disease, and the blood Hinton reaction was negative; there was no history of rheumatism. It does not seem as though we had to consider an arteriosclerotic, hypertensive lesion at this age, with no evidence of hypertension. I take it that no fever was connected with this episode, and it does not seem as if we have to consider bacterial endocarditis. The factors in favor of a rheumatic heart are the patient's age, and the fact that he had hemoptysis as a presenting sign. He presumably had a mitral lesion from the description of the heart murmurs. In favor of the syphilis are the fact that he came to grief quite suddenly at the age of thirty-four, with no story of previous cardiac disease, the fact that there was pain of an anginal nature as such an outstanding symptom, the obvious aortic-valve disease, the description of the left ventricular enlargement without much emphasis on mitral shape to the heart, and the failure with normal cardiac rhythm. If he had only had auricular fibrillation, we could then have said right away that this was a rheumatic heart. The question of hemoptysis is perhaps an important factor here. The hemoptysis goes back two years. It is true that aneurysm of the aorta may cause hemoptysis of a small amount for weeks or even months before a final rupture, but it is much more likely that rheumatic heart disease would be the background. The last issue of the *American Heart Journal* has an analysis of fifty cases of hemoptysis in rheumatic heart disease by Wolff and Levine,* and I was interested to see in their figures that almost half of these patients (and they died within a relatively short time) had normal cardiac rhythm rather than auricular fibrillation. Wolff and Levine found that active rheumatism, pulmonary infarction and high degrees of pulmonary arteriosclerosis were the common mechanisms of hemoptysis in this rheumatic group, and pulmonary infarct was the commonest cause if congestive failure was present at the time. The average age at the onset of hemoptysis was approximately thirty-three years.

*Wolff, L. and Levine, H. B. Hemoptysis in rheumatic heart disease. *Am. Heart J.* 21:163-171, 1941.

Then there is this terminal episode, which I may have to ask more questions about. It consists in severe pain in the lower back. Where is the lower back?

DR. MCGINN: I cannot help on that. I saw him on only one occasion. This is a history from the family.

DR. SPRAGUE: The patient had marked dyspnea and cough, which were apparently relieved by nitroglycerin. He had a condition that at least allowed him to get up and go to his breakfast the next morning. The pain and the dyspnea apparently continued, and then he started to cough up blood. The pain, I judge from the story, remained severe in his back, although we are told that he clutched his chest. Whether or not he had two pains from the same cause, I do not know. He lived for only twenty-four hours after the onset of the pain. Was this an attack of angina pectoris, or coronary occlusion, or could he have had a dissection into his aorta, or was it a good-sized pulmonary embolism, or did he have an occlusion of his aorta, or an embolic affair in some peripheral vessel, renal or mesenteric, or could he possibly have had a coronary embolism? I am going to say that he showed the rheumatic heart lesions that I have mentioned. He may have had multiple pulmonary infarcts. He may have had a complicated condition in the region of the aortic valve. Dr. Mallory has a most extraordinary collection of weird aortic lesions. It seems as if this patient had a high degree of coronary obstruction, perhaps at the coronary ostia; there might even have been some local dissection of the aorta in this region. He may have had an embolic occlusion of some branch of the aorta farther down. I always keep in the back of my mind the fact that these cases may be syphilitic because we had one man here at the age of twenty-nine on whom we made a diagnosis of rheumatic heart disease with an aortic lesion and severe angina pectoris, and a sympathectomy was done for relief. After he was operated on, the blood serologic findings came back positive, and he died suddenly thirteen days later with a very active syphilitic process in the aorta. I think all the evidence in this case, however, points in the other direction.

DR. WYMAN RICHARDSON: I want to say that the terminal events seem to me very much like a rupture of a vessel. Therefore, I should lean toward syphilis.

DR. SPRAGUE: I shall commit myself to a diagnosis of rheumatic heart disease with aortic regurgitation and stenosis and mitral stenosis. The final episode suggests a vascular occlusion or a vascular rupture. If I leaned toward syphilis, I should say rupture, but since I have leaned toward rheumatism, I say coronary occlusion.

DR. MCGINN: The first attacks of angina pectoris apparently were associated with paroxysmal auricular tachycardia or fibrillation. Later on when I saw the patient he had an irregular pulse, apparently owing to extrasystoles, for the electrocardiogram showed no fibrillation. Aminophyllin by mouth gave very striking relief for about four months — much more than had been anticipated. When I heard of the final episode, and after having advised salyrgan, I thought it was the kidney reaction that one sees sometimes after mercurial diuretics. I telephoned the patient's house and found that the pain had preceded the injection by about eight hours, so that such a kidney reaction could not be the explanation.

CLINICAL DIAGNOSES

Rheumatic heart disease.
Congestive failure.

DR. SPRAGUE'S DIAGNOSES

Rheumatic heart disease.
Aortic regurgitation and stenosis.
Mitral stenosis and slight regurgitation.
Multiple pulmonary infarcts.
Terminal arterial occlusion, ? site.

ANATOMIC DIAGNOSES

Rheumatic heart disease, chronic, with aortic and mitral stenosis and slight tricuspid endocarditis.
Cardiac hypertrophy.
Chronic passive congestion of lungs, liver and spleen.
Hydrothorax, bilateral.
Chronic pulmonary tuberculosis, bilateral, healed apical.
Arteriosclerosis, minimal, aortic and coronary.

PATHOLOGICAL DISCUSSION

DR. MALLORY: The post-mortem examination showed rheumatic heart disease. The heart was much enlarged, weighing 640 gm. There was aortic stenosis and regurgitation and mitral stenosis, some involvement of the tricuspid valve and definite thickening without significant deformity. Both ventricles were hypertrophied, which explains the lack of axis deviation. There were no thrombi in any of the cardiac chambers and no infarction anywhere in the body. There were no pulmonary emboli. The lungs were deeply congested, with the heavy stiff texture that one sees in the most chronic type of pulmonary congestion. Very little fluid could be expressed by

pressure. There was no anatomic cause, however, for the suddenness of the terminal episode. The coronary arteries showed a few small atheromatous plaques, but nothing that caused any significant narrowing. On the posterior surfaces of the aortic cusps there were large calcareous masses projecting into the sinuses of Valsalva. The question has often been raised in such cases whether these masses ever impinge on the coronary ostia. Since the blood flow in the coronaries occurs in diastole, one would expect the aortic ring to be stretched to its limits at this time, which seems a little unlikely.

DR. SPRAGUE: I wonder how nitroglycerin could relieve a person with angina pectoris based on obstruction in the sinuses of Valsalva. Could it, by peripheral vascular relaxation, open up the sinuses?

DR. MALLORY: I do not know. It should lower the blood pressure and collapse the aorta rather than dilate it further. Certainly I think one can say that there was no good anatomic evidence of any coronary narrowing, despite the long history of angina.

CASE 27122

PRESENTATION OF CASE

A fourteen-year-old-boy entered the hospital complaining of pain in the right knee.

The patient felt well until six weeks before admission, when he became tired, easily fatigued and complained of general malaise. A week later and coincident with a chill he noticed pain in his right knee while walking; it increased in severity over the next few days to a point where it was present at rest. At this time he developed a cold; weakness, general malaise and pain increased, so that he went to bed of his own volition and remained there until the time of admission. During the weeks before entry, he suffered from several chills, night sweats and anorexia. The pain in the knee was aggravated by motion and varied in severity, so that sometimes even the weight of the bedclothes hurt. "The pain went off and on like a light flashing." For two or three days two weeks before admission fleeting pains developed in the right hip and ankle and in the muscles of the leg, lasting for perhaps four or five minutes and then fading. At this juncture the patient also noticed that he was unable to extend his knee fully. No history of trauma could be elicited. The patient stated that he had been subject to furuncles and boils for some time. There had been a weight loss of 15 pounds since the beginning of the illness.

One sister was being treated for rheumatic fever. A year previously the patient had been examined in another hospital, but apparently no abnormalities were found.

On physical examination the patient was rather poorly developed and poorly nourished, and he looked tired and ill. Two small furuncles were present on the upper lip, and one on the lower. The heart, lungs and abdomen were normal; the blood pressure was 125 systolic, 68 diastolic. There was a 4.4-cm. atrophy of the right thigh, but no wasting of the calf. The right knee was held in 20° flexion, but could be corrected passively. Free motion was present between 20° and 75° flexion without discomfort, but beyond these points pain was felt. At the medial aspect of the lower end of the right femur immediately proximal to the femoral condyle, there was a firm, slightly tender fullness. There was no redness or obvious increase in skin temperature over this fullness; the knee joint did not appear to be involved in the process, and there was no increase in fluid or thickening of the synovia.

The temperature was 101.5°F., the pulse 120, and the respirations 24.

The urine was normal. Examination of the blood showed a red-cell count of 4,700,000 with a hemoglobin of 75 per cent, and a white-cell count of 14,000 with 87 per cent polymorphonuclears. The sedimentation rate was 42 mm. in one hour. The serum protein was 7.3 gm., the calcium 9.9 mg. and the phosphorus 4.8 mg. per 100 cc., and the phosphatase was 6.3 Bodansky units. A blood Hinton test was negative, the tuberculin test was negative in dilutions of 1:10,000, 1:1000 and 1:100.

An x-ray film of the knee showed an area of destruction in the distal medial end of the right femur close to the epiphyseal line, but not crossing it. The cortex showed destruction in parts, and there was periosteal new-bone formation along the extent of the lesion, with some amorphous areas of calcification in the soft tissues outside the stratified new-bone formation. Some soft-tissue swelling was present, but a definite soft-tissue mass was not outlined.

For the next few weeks the temperature ran between 99 and 101°F., and the white-cell count averaged 12,000. Three weeks after admission an operation was performed.

DIFFERENTIAL DIAGNOSIS

DR. THOMAS J. ANGLEM: May we see the x-rays?

DR. GEORGE W. HOLMES: I am familiar with the case, and I cannot improve very much on the description in the text. I might point out one

or two things. First, the lesion does not cross the epiphyseal line, and we stressed that fact in our report. It is true that tumors are less likely than infections to cross an epiphyseal line, but infections do not always cross the line. I think that sign has been overevaluated. The process in the bone is largely destructive. There is rather more destruction than new-bone formation. The primary process is a destructive one, with reaction in the periosteal tissue around it, which is a little in favor of infection. I think the benign tumors are out; we do not need to discuss them to any extent. To my mind the problem is between an infection and a malignant tumor. I should also call attention to the character of this proliferation. That is typical spicule formation such as one sees in malignant tumor. It can occur in infections, but it is not typical.

Dr. Grantley W. Taylor: Do you want to comment on the presence or absence of the soft-part tumor in association with this, or the presence of edema in the subcutaneous tissue?

Dr. Holmes: Soft-tissue tumor is much more likely to be present in a malignant tumor than it is in an infection. It is a localized, sharply defined tumor, whereas in infection there is diffuse swelling and edema over the whole area; however, edema may occur in malignant tumors, and it may sometimes be absent in infection. It is only a matter of probability. Of course, the amount of swelling in this case is not what one would expect to see in a large malignant tumor. We thought that there was some edema. There is no well-defined soft-tissue tumor.

Dr. Anglem: This record at first reading left me with a very strong impression that we were dealing with an acute hematogenous osteomyelitis that had passed over into a subacute or semichronic phase. We have a boy of fourteen, an age when this disease is common. He complained of fatigue and malaise, following which he had the sudden appearance of pain in the right knee, which was ushered in with a chill. The pain increased in severity in succeeding weeks. Then he had additional chills, night sweats and anorexia, and shortly before admission he was unable to extend his knee. On admission his temperature was 101.5°F., the white-cell count 14,000 with 87 per cent polymorphonuclears, and there was a mild anemia. On examination of the knee, we found that on palpation a firm, slightly tender fullness was observed, without redness of the skin over the area and with no evidence of joint involvement, no evidence of reactive synovitis or of fluid in the joint.

There are certain inconsistencies, however, that raise some doubt of the correctness of this diagnosis. For example, this boy is said to have had pain that increased over the first few days after the onset, and at the end of a few days was present at rest. In other words, we must conclude that then he was up and about, which we should hardly expect him to be if he had come down with osteomyelitis from an organism of sufficient virulence to cause chills. He apparently did not take to bed until several days after the onset, when malaise and weakness finally made their appearance. In other words, the toxemia that we associate with acute hematogenous osteomyelitis must have been absent or very slight. We might explain that by assuming that the organism was of low virulence. If that were true, we should hardly expect the sudden onset with chill; we should like to know more about the chills. Were they genuine rigor or merely chilly sensations that might be associated with any fever? We should also like to know if a blood culture was taken, and if so, what the report was.

Dr. Tracy B. Mallory: There were no blood cultures. Here is the preoperative chart. The highest recorded rectal temperature is 101°F., and the highest by mouth is 100.

Dr. Anglem: What other possibilities are there? I still reserve judgment, but I think that at least there is some doubt as to the presence of a pyogenic infection here. The negative blood Hinton test and a negative tuberculin in a dilution of 1:100 make it unnecessary to regard seriously either syphilis or tuberculosis. The clinical course is not typical of either. Syphilis of bone would be extraordinarily rare at this age, and the location of the lesion in the metaphysis rather than the epiphysis is against the diagnosis of tuberculosis. The malignant tumor that is most likely to simulate osteomyelitis and to be confused with it is Ewing's sarcoma. It is very frequently characterized by fever, leukocytosis and pain such as is present in this case; but the mode of onset in most cases is quite different from what we have observed here. The characteristic syndrome is one of rather mild pain coming on intermittently at intervals over a long period of time — several months, even as long as a year. The intervals of pain may or may not be associated with fever and leukocytosis, but in most cases there is a rather long duration of the illness before the patient is finally obliged to take to bed, in contrast to a few days in this case. Moreover, Ewing's tumor in the vast majority of cases, although we have just seen an exception, is situated in the shaft of the bone, and this lesion does not seem to me particularly to suggest Ewing's sarcoma by x-ray, al-

though I do not believe it can be ruled out entirely. This disease does occur in this area in rare cases and can present itself in atypical forms that are difficult to diagnose. I neglected to mention, and it may be of some importance later in the discussion, that the patient described the pain as "coming on and off like a light flashing"; we are more accustomed to see that type of pain associated with tumor than with osteomyelitis. To go back to Ewing's tumor again, it is most often confused with the subacute or chronic type of osteomyelitis, which we might well have here.

In contrast, osteogenic sarcoma in certain forms is likely to simulate an acute osteomyelitis in onset. Unlike Ewing's tumor, the pain, once it starts, is persistent with no letup for any appreciable length of time. Certain forms of osteogenic sarcoma are associated with fever and leukocytosis and pain, particularly the osteolytic type, which occurs in young people frequently in and around this age — fourteen to twenty. We have to consider it seriously here, and in support of this diagnosis and against the diagnosis of osteomyelitis I think we might point out that nowhere in the history is there any indication of appreciable swelling, redness or marked tenderness in association with this lesion, which at the time of examination was described as a slightly tender fullness with no real appreciable swelling. So far as we know the skin was not red, and there was no inflammatory reaction in the adjacent joint. All these factors, I believe, are in accord with the diagnosis of tumor rather than osteomyelitis. The x-ray picture can fit either diagnosis.

I think that the diagnosis in this case hinges on interpretation of the story, particularly the story of chills. If we knew definitely that these were real shaking chills, I should favor strongly the diagnosis of osteomyelitis that has gone over into a subacute phase, but I am inclined to discount the story of chills and furuncles because of the peculiar way in which the point is interjected into the story. It is said that at some time in the past the patient had furuncles, but there is no definite indication that he had furuncles immediately preceding these symptoms. I hesitate to discount the story of chills, but considering the whole picture I should favor a diagnosis of osteolytic osteogenic sarcoma.

Clinical Diagnosis

Bone tumor?

Dr. Anglem's Diagnosis

Osteogenic sarcoma, osteolytic type.

Anatomic Diagnosis

Subacute osteomyelitis of the femur.

Pathological Discussion

Dr. Mallory: The preoperative consensus was that this was a malignant tumor, but a good deal of difference of opinion was expressed. Have you any comment, Dr. Taylor?

Dr. Taylor: No, I think Dr. Anglem discussed all the points and more than the ones we took into consideration.

Dr. Holmes: May I ask whether he had any chemotherapy?

Dr. Mallory: I think not. I can see no report of it.

It was decided to biopsy this lesion with a pathologist on hand for a frozen section, and to be prepared for amputation, if it should be necessary. At the biopsy, frank pus was found, and cultures showed *Staphylococcus aureus*. The material curetted from the margins of the cavity showed acute and chronic inflammation, so that I think tumor is certainly ruled out.

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The Journal does not hold itself responsible for statements made by any contributor.

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MEDICAL ADVISER TO THE MASSACHUSETTS DEPARTMENT OF PUBLIC WELFARE

The appointment of a medical adviser to the Massachusetts Department of Public Welfare, as noted elsewhere in this issue of the *Journal*, is an important step forward, with many implications as to future developments. The well-known relation between poverty and disease, with a consequent overlapping, makes this position a crucial one. It has been assumed that there is a causal link between poverty and disease, some emphasizing poverty as a cause of disease, and others, disease as a cause of poverty. Although both these points of view are undoubtedly to some extent justified, it is perhaps also true that they are but twin sisters of those great parents of all misery — ignorance and vice.

The profession awaits with interest the developments that will come from this appointment.

ROBERT FORTESCUE FOX

In the death of Dr. Robert Fortescue Fox, of London, England, on June 15, 1940, in his eighty-second year, there passed one of the most significant influences operative in the world toward bringing about that acceptance of the importance of the rheumatic diseases which exists today and is everywhere on the increase. Dr. Fox came of a medical family and was a member of the Society of Friends. His personality and work were characterized by those qualities of kindliness, consideration and purpose which the world has learned to associate with that sect, and he was buried very near the grave of one of the greatest apostles of the order, William Penn.

Perhaps partly as a result of his own early struggle with tuberculosis, he was something of a medical fundamentalist and entertained a profound belief in the efficacy of natural defenses and agents, when properly co-ordinated, in the treatment of disease. Using physical agents, first empirically and later on the basis of controlled observations, he became an authority in the field of physical therapy and spa treatment. Of him Sir Humphry Rolleston writes, "He was a gentle though persistent pioneer of physiotherapy and spa treatment, persuasive by his convictions rather than dictatorial."

In addition to numerous contributions to medical literature, Dr. Fox was the founder and editor of the *Archives of the International Society of Medical Hydrology*. He was a leading spirit in starting in London the Red Cross center for the treatment of rheumatic diseases and was active in the development and provision of adequate facilities for the care of ex-service men.

Active to the last, he recently advocated a program for a Committee for Research on Delicate Children, and on the day of his death a letter appeared from him in the London *Times* on the need

for a properly organized system of physical treatment for the troops.

Dr. Fox's greatest contribution was probably in connection with his untiring and persistent efforts in founding, with Dr. J. van Breemen, of Amsterdam, Holland, prior to 1926, the Ligue Internationale contre le Rhumatisme, of which he served as president for many years, retiring after the brilliant sixth congress of the Ligue held in London, Oxford and Bath in March and April, 1938.

As a practical idealist he encountered much resistance but lived to see his labors bear wide fruition. It can fairly be said that the pivotal role played by Dr. Fox as a pioneer in the field of rheumatic diseases will gather rather than lose significance when the history of the movement to control these disorders is written.

MEDICAL EPONYM

Gull's Disease

The article, "On a Cretinoid State Supervening in Adult Life in Women," which has bound the name of Sir William W. Gull (1816–1890) to this condition, was read before the Clinical Society of London on October 24, 1873, and appears in the *Transactions* of that society (7: 180–185, 1874).

> The remarks I have to make upon the above morbid state are drawn from the observation of five cases. Of two of these I am able to give many details, but the three others were only seen by me on one or two occasions.
>
> Case 1
>
> Miss B., after the cessation of the catamenial period, became insensibly more and more languid, with general increase of bulk. This change went on from year to year, her face altering from oval to round, much like the full moon at rising. With a complexion soft and fair, the skin presenting a peculiarly smooth and fine texture was almost porcelainous in aspect, the cheeks tinted of a delicate rose-purple, the cellular tissue under the eyes being loose and folded, and that under the jaws and in the neck becoming heavy, thickened and folded. The lips large and of a rose-purple, alae nasi thick, cornea and pupil of the eye normal, but the distance between the eyes appearing disproportionately wide, and the rest of the nose depressed, giving the whole face a flattened broad character. The hair flaxen and soft, the whole expression of the face remarkably placid. The tongue broad and thick, voice guttural, and the pronunciation as if the tongue were too large for the mouth (cretinoid). The hands peculiarly broad and thick, spade-like, as if the whole textures were infiltrated. The integuments of the chest and abdomen loaded with subcutaneous fat. The upper and lower extremities also large and fat, with slight traces of oedema over the tibiae, but this not distinct, and pitting doubtfully on pressure. Urine normal. Heart's action and sounds normal. Pulse, 72; breathing, 18.
>
> Such is a general outline of the state to which I wish to call attention.

R. W. B.

MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS AND GYNECOLOGY*

Raymond S. Titus, M.D., *Secretary*
330 Dartmouth Street
Boston

Maternal Mortality in Massachusetts

The cases that have been appearing in the *Journal* on obstetrics and its complications have come in most part from the files of private cases in the practice of members of the Committee-At-Large of the Section of Obstetrics and Gynecology. They have been grouped to illustrate specific conditions. Beginning with this issue and continuing for an indefinite time, cases will be reported from the Maternal Mortality Study in Massachusetts during the last four years. In general, the form of the cases already reported will be followed; of necessity some details may be absent. No attempt will be made to group cases according to specific complications. All these cases, of course, were fatalities.

A twenty-eight-year-old primipara was said to have been seen when about three months pregnant. The physical examination at that time was essentially negative. The heart was not enlarged; there were no murmurs. The lungs were clear and resonant; there were no rales. The pelvic measurements were normal. The blood pressure was said to be normal. The uterus was enlarged to a size consistent with the period of amenorrhea.

The patient was seen in the fifth and seventh months but not again until labor started at term by the rupture of the membranes. After a labor, which was said to have been only four hours in duration, an attempt at forceps delivery was made. When this procedure was unsuccessful, a version was attempted. It was reported that a contraction ring was present and that the patient bled very freely. A consultation was held, but the patient died undelivered.

Comment. This case represents obstetrics at its worst. The prenatal care was absolutely inade-

*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

quate. The patient was seen but three times during her pregnancy, and an interval of at least six weeks occurred between the last visit and the onset of labor. The consultant believed that the pelvis was adequate, so that the need of an elective cesarean section because of definite disproportion did not exist. It is conceivable that a primipara after four hours of labor might attain full dilatation. The history of this case suggests that this was not so. Had complete dilatation been present with a head well engaged, it is impossible to believe that forceps delivery would have failed. That it did fail leads one to the probable inference that complete dilatation was not present, and that in an attempt to dilate the cervix manually so that forceps could be applied the head was disengaged and made the operation difficult even in the hands of the best-trained men. When in the hands of the operator forceps were found inefficient and version was attempted, it is most likely that the uterus was ruptured, causing excessive external and concealed hemorrhage. Such results can in no way be justified, and so long as hospitals in Massachusetts allow such procedures and do not regulate all obstetric operating, these results will be repeated.

COMMITTEE ON STATE AND NATIONAL LEGISLATION

At its meeting on February 5, the Council voted to oppose the following bills, which have been reported favorably by the Committee on Public Health:

H. 114. Bill (accompanying House No. 113, recommendations of the Board of Registration in Medicine) relative to providing for the annual registration of physicians and the biennial publication of the list of physicians duly registered.

H. 115. Bill (accompanying House No. 113, recommendations of the Board of Registration in Medicine) relative to the recording of the certificate of registration of a qualified physician by the town clerk.

H. 116. Bill (accompanying House No. 113, recommendations of the Board of Registration in Medicine) relative to establishing a special commission to investigate and study the advisability and practicability of requiring special qualifications of all physicians who engage in the practice of surgery.

H. 114 and H. 115 have been referred to the Committee on Ways and Means, whose members are as follows:

Committee on Ways and Means: Senators Arthur W. Hollis, 90 Washington Street, Newton, Senate Chairman; Harris S. Richardson, 15 Mt. Pleasant Street, Winchester; Cornelius F. Haley, Main Street, Rowley; Laurence Curtis, 15 River Street, Boston; Joseph L. Murphy, 57 Samoset Street, Boston.

Representatives Albert F. Bigelow, 246 Dudley Street, Brookline, House Chairman; Walter R. Baylies, 48 William Street, Taunton; James A. Peckham, 2 Upland Road, Wellesley; Paul W. Foster, North Plain Road, Great Barrington; Douglass B. Francis, 35 Meadowbrook Road, Newton; Albert Bergeron, 35 Mt. Vernon Street, Lowell; Charles H. Roberts, Jr., Salem End Road, Framingham; Robert S. Backus, Nantucket; Nathaniel Tilden, 37 Elm Street, Scituate; Richard J. White, Jr., 8 Upham Road, Lynn; Anthony R. Doyle, 150 Beacon Street, Worcester; James F. Tobin, 117 Mason Street, Salem; Patrick G. Sullivan, 92 Codman Hill Avenue, Dorchester; Joseph H. Downey, 254 Main Street, Brockton; Jeremiah D. W. Crowley, 462 Washington Street, Brighton.

H. 116 has been referred to Committee on Rules, the members of which are the following:

Committee on Rules: Senators Angier L. Goodwin, 33 Reading Hill Avenue, Melrose, Senate Chairman; Jarvis Hunt, 51 High Street, North Attleboro; Newland H. Holmes, 83 Webb Street, Weymouth; Donald W. Nicholson, Highland Road, Wareham; Mason Sears, West Street, Dedham; David M. Brackman, 52 Brookledge Street, Dorchester; Chester A. Dolan, Jr., 987 Parker Street, Jamaica Plain.

Representatives Christian A. Herter, 61 Beacon Street, Boston, House Chairman; William A. Jones, Main Street, Barnstable; Rudolph F. King, 163 Exchange Street, Millis; Alfred M. Bessette, 171 Query Street, New Bedford; William R. Gilman, 83 Fellsmere Road, Malden; William A. Akeroyd, Prospect Street, Lanesborough; Fred A. Hutchinson, 36 Savory Street, Lynn; Hiram N. Dearborn, 86 Electric Avenue, Somerville; Nelson B. Crosby, 10 Davis Avenue, Arlington; Fred B. Dole, Shelburne; John E. Troy, Jr., 54 Pleasant Hill Avenue, Dorchester; Joseph N. Roach, 561 Main Street, North Adams; Andrew J. Coakley, 19 Bell Street, Chicopee.

If the members of either of these committees come from your district, be sure to write to them, asking them to defeat the bills in their committee, and in any event, write to your representative and ask him to vote against the bills when they reach the floor of the House of Representatives.

The following bill is scheduled for hearing at the State House during the week of March 24:

March 27

H. 870 (Public Health). Petition of the Massachusetts Mothers' Health Council for legislation to protect working women before and after childbirth. The aims and purposes of this bill are endorsed. *Favored.*

MEDICAL POSTGRADUATE EXTENSION COURSES

The following sessions, given by the Massachusetts Medical Society in co-operation with the Massachusetts Department of Public Health, the United States Public Health Service and the Federal Children's Bureau, have been arranged for the week beginning March 23:

BERKSHIRE

Thursday, March 27, at 4:30 p.m., in the Bishop Memorial Building, Pittsfield. Chemotherapy in the Treatment of Gonococcal Infection. Instructor: Weston T. Buddington. Harry G. Mellen, *Chairman.*

BRISTOL SOUTH (Fall River Section)

Tuesday, March 25, at 4:30 p.m., at the Union Hospital, Fall River. Obstetric Complications, with Case Histories and Clinical Problems. Instruc-

tor: James C. Janney. Howard P. Sawyer, *Chairman.*

FRANKLIN

Thursday, March 27, at 8:00 p.m., in the Library of the Franklin County Public Hospital, Greenfield. Management of Abdominal Distention. Instructor: Hollis L. Albright. Halbert G. Stetson, *Chairman.*

HAMPDEN

Wednesday, March 26, at 4:00 p.m., at the Academy of Medicine, Professional Building, 20 Maple Street, Springfield, and at 8:00 p.m., in the Outpatient Department of the Skinner Clinic, Holyoke Hospital, Holyoke. Diagnosis and Treatment of Minor Lesions in Rectum and Anus. Instructor: E. Parker Hayden. Alfonso A. Palermo, *Chairman.*

HAMPSHIRE

Thursday, March 27, at 4:15 p.m., in the Nurses' Home of the Cooley Dickinson Hospital, Northampton. Infections of the Hands and Feet. Instructor: William E. Browne. Robert C. Byrne, *Chairman.*

WORCESTER

Tuesday, March 25, at 8:30 p.m., in the Nurses' Home of the Milford Hospital, Milford. Pediatric Case Discussions. Instructor: Warren R. Sisson. Joseph Ashkins, *Chairman.*

WORCESTER NORTH

Friday, March 28, at 4:30 p.m., in the Nurses' Home of the Burbank Hospital, Fitchburg. Technic and Treatment of Primary, Secondary and Tertiary Syphilis. Instructor: Rudolph Jacoby. George P. Keaveny, *Chairman.*

DEATHS

CLEAVES — Edwin N. Cleaves, M.D., of Boston, died February 24. He was in his fifty-second year.

Dr. Cleaves received his degree from Harvard Medical School in 1915. He was a member of the Massachusetts Medical Society, the American Medical Association, the American Roentgen Ray Society, the New England Roentgen Ray Society and the American College of Radiology.

SHEA — Peter O. Shea, M.D., of Worcester, died March 9. He was in his seventy-second year.

Born in Worcester, he graduated from Holy Cross College and received his degree from Columbia University College of Physicians and Surgeons in New York City in 1895. He received an M.A. degree from Holy Cross College in 1896.

Dr. Shea was a former trustee of the Grafton State Hospital, having served for six years in that capacity. He was Director of the Board of Health at Worcester at the time of his death and had been a member of the Board since 1925. He was a fellow of the Massachusetts Medical Society and of the American Medical Association.

His daughter, a sister and a brother survive him.

SIMMONS — Lt.-Col. Ralph H. Simmons, M.D., of Fort Adams, Rhode Island, died March 13 at the Walter Reed Hospital, Washington, D.C. He was in his fifty-third year.

Born in Brockton, he attended the local schools there and received his degree from Tufts College Medical School in 1913. For the next three years he was resident physician at the Union Hospital, Fall River. He had served overseas during World War I and at the time of his death was post surgeon at Fort Adams, Rhode Island.

He was a fellow of the Massachusetts Medical Society and the American Medical Association, and held memberships in the American Academy of Ophthalmology and Oto-Laryngology and the American College of Surgeons.

His widow, a son and two sisters survive him.

WORTHING — Frank B. Worthing, M.D., of Chatham, died March 13. He was in his seventy-second year.

Born in Hallowell, Maine, he received his degree from the Bowdoin Medical School in 1896. He was a member of the Massachusetts Medical Society, the American Medical Association and the Cape Cod Medical Association.

His widow, a daughter and a son survive him.

MISCELLANY

MEDICAL ADVISER TO THE MASSACHUSETTS DEPARTMENT OF PUBLIC WELFARE

Dr. B. W. Mandelstam was recently appointed medical adviser to the Massachusetts Department of Public Welfare. Born in Boston, he graduated from Tufts College Medical School in 1932 and later served an internship at the Lynn Hospital. Then followed seven years of active general practice in Bridgewater, where he had an opportunity for close contact with the medical problems of welfare recipients and welfare boards, as well as insight into the physician's attitude toward these problems. He will act as an adviser to the department in all matters relating to medical care. It is hoped that this appointment will be an aid to the medical profession in the recognition that welfare activity is both a professional and civic duty. It is also hoped that the profession will co-operate with him and the department in keeping such care on a high professional plane, at the lowest possible cost, as a means of continuing our present system of free choice of physician.

Plans have been made for the appointment of an advisory committee to be composed of persons representing the various professions concerned with the medical care of the needy, as an aid to working out a satisfactory program.

IMPORTANCE OF THE TUBERCULIN TEST

Methods for finding cases of tuberculosis have not yet been reduced to a standardized pattern. Experience has prompted certain changes, and practical considerations make it necessary to eliminate wasteful methods. Pressed by the need for economy some workers now place almost sole reliance on the x-ray and seem ready to discard the tuberculin test as a selective screen. Among those who believe that the tuberculin test is still of great importance is Myers. In a recent paper (Tuberculosis in students, *Am. Rev. Tuberc.* **43**:235-244, 1941) he delineates his conception of tuberculosis, which some may not accept in practice but which furnishes food for thought. An abstract of the discussion follows.

Ten years ago, to say that a student had tuberculosis really meant that he had consumption. It was the tuberculosis diagnosed by the ancient Chinese, Babylonians,

Greeks and all since their time. A more recent and more logical conception of tuberculosis is that it begins when the first neutrophil phagocytizes a tubercle bacillus, and that the outcome depends on subsequent physiologic events. From three to seven weeks after tubercle formation begins, the tissues are sensitized to the protein fraction of the tubercle bacillus, and apparently remain sensitized so long as tubercle bacilli are alive in the body. This sensitivity is determined by the tuberculin test. The tubercles may be microscopic in size, and there is no way of determining in a given person whether clinical tuberculosis will ever make its appearance. Since the body is seeded with tubercle bacilli, clinical lesions may appear at any time and in almost any place. Therefore, all who react to tuberculin have tuberculosis.

The acceptance of this idea is imperative, says the author, because it is the only conception that will lead us to the control of the disease. Normal appearance and normal x-ray shadows in a positive reactor do not justify looking lightly on the condition. Inspection of the chest does not include the entire lung, and some lesions may be too small to cast shadows. Moreover, clinical tuberculous lesions may develop in many parts of the body other than the lung.

> Even if we could be certain that in the tuberculin reactors there are at the moment no lesions except those of the primary complexes, we have no way of determining what minute acute or chronic clinical lesions will develop or where they will be located. The reactor whose complete examination is negative today may have tuberculous meningitis, miliary disease, tuberculous pneumonia, peritonitis, pleurisy with effusion or synovitis, tomorrow.

Chronic clinical tuberculosis is essentially a disease of adults — it begins to get into its stride only in the college and university age period. Therefore, one finds only a small percentage of positive tuberculin reactors with chronic, clinical tuberculous lesions during their few student years, yet it is of great importance that their disease be detected before it becomes contagious.

> Occasionally one asks why it would not be better to omit the tuberculin test and proceed directly to the x-ray film inspection of the chest, since the occasional person has spoken of this inspection as the best case-finding method. No student of tuberculosis could be satisfied with such a procedure because the x-ray film examination is totally inadequate in determining the true tuberculosis situation in any student body. Such examination is limited to a small part of the body; indeed, it does not include more than 75 per cent of the lungs themselves. Moreover, it reveals evidence only of gross lesions and does not differentiate these with reference to etiology, tuberculous or nontuberculous. We divide pathology into gross and microscopical for teaching and practical purposes. The x-ray reveals only the gross. For example, among those who have primary tuberculosis complexes in the body, the x-ray film of the chest reveals evidence of their presence in only approximately 10 to 15 per cent. The student of tuberculosis demands something far more delicate than the x-ray film and he finds it in the tuberculin test.
>
> It would be as futile to try to control tuberculosis without the tuberculin test as to try to control syphilis without the Wassermann or an equally good test. At the University of Minnesota we have in the neighborhood of 4500 entering students each year and the tuberculin test indicates that approximately 1000 of them have the first-infection type of tuberculosis somewhere in their bodies; that is, primary tuberculosis complexes have been established, and to us the tuberculin reaction means that living tubercle bacilli are present. Among our reactors, only 100 to 150 present any evidence that might be interpreted as representing the primary tuberculosis complex on the x-ray film of the chest. Of the entire 1000, rarely more than 10 to 15 have, at the moment, lesions in the lungs which cast shadows that might be due to the clinical form of pulmonary tuberculosis. Thus, if we depended entirely on the x-ray film examination, we would overlook 85 per cent or more of the students who actually have tuberculous lesions in their bodies. Each of the 1000 students who reacts to the tuberculin test is a potential clinical case of tuberculosis some time in life and in the occasional one this form of the disease will actually occur while in school. Therefore, we feel that this group of 1000 students should be listed and observed from year to year for clinical tuberculosis, just as one lists those who have not been immunized against smallpox or diphtheria as the susceptibles in case of an outbreak of one of these diseases on the campus.

Experience in eradicating tuberculosis in cattle justifies our faith in the tuberculin test.

> The veterinarians of this country have made more than 217,000,000 tuberculin tests on cattle between 1917 and 1939. The carcasses of more than 3,700,000 reactors were examined postmortem, and the accuracy with which the test selected those with tuberculous lesions was little short of miraculous. Indeed, it was only through the tuberculin test as the detective that tuberculosis has been almost eradicated from the cattle herds of this nation.

Of course no tuberculosis program is complete that stops with the tuberculin test. Reactors should have a chest x-ray examination, preferably by film inspection, although the fluoroscope in the hands of an expert may equal the film inspection. Those students with shadows of lesions must be examined in considerable detail, and in those with shadows that persist, laboratory examinations, including the search for tubercle bacilli in the gastric contents, must be made.

The author gives the following answer to the question, Must students contract tuberculosis while in college?

> No, because we have at our command accurate methods of screening our contagious cases of tuberculosis in any group. Therefore, if we keep students under sufficiently close observation, it is with great rarity that one will enter with contagious disease or will develop it on the campus so as to disseminate it to other students. Thus, the students may be prevented from contracting tuberculosis from one another. . . . It is true that the occasional student will become infected through contact with a contagious case entirely apart from the campus. However, in most parts of this country such infections have been reduced to one per cent or less per year. Therefore, few students become infected even in this manner while they are in college. — Reprinted from *Tuberculosis Abstracts*, March, 1941.

NOTICES

HARVARD SCHOOL OF DENTAL MEDICINE

Harvard University announced recently the opening of a five-year course combining medical and dental training. The new school of dental medicine was established for the purpose of training new types of scientific workers, combining the skills of both medicine and dentistry.

Next fall, with the opening of the new school, dental students will register in both the School of Dental Medi-

cine and in the Harvard Medical School for a five-year course, taking approximately three and a half years of the same medical courses as other students in the medical school, and, in addition, an amount of specific dental training sufficient to qualify them for dental practice. Graduates will receive both the M.D. and the D.M.D. degrees.

BOSTON MEDICAL HISTORY CLUB

There will be a meeting of the Boston Medical History Club at the Boston Medical Library, 8 Fenway, Boston, on Monday, March 24, at 8:15 p.m. Professor J. Walter Wilson, of the Department of Biology, Brown University, will speak on "The Role of Art in the Development of the Natural Sciences in the Renaissance."

All interested persons are cordially invited to attend this meeting.

MASSACHUSETTS GENERAL HOSPITAL

A meeting of the Hospital Research Council will be held in the Ether Dome of the Massachusetts General Hospital, on Tuesday, March 25, at 5:00 p.m.

PROGRAM

Decrease in Cardiac Efficiency Due to Varicose Veins. Dr. E. M. Chapman.

The Effect of Evipal upon Two Major Respiratory Drive Mechanisms. Drs. C. A. Moyer and H. K. Beecher.

Mechanisms of Respiratory Failure under Barbiturate Anesthesia (Evipal, Pentothal). Drs. H. K. Beecher and C. A. Moyer.

TUFTS COLLEGE MEDICAL SCHOOL ALUMNI ASSOCIATION

Professor W. Barton Leach, of the Harvard Law School, will be the guest speaker at the annual Tufts College Medical Alumni Dinner, at 7 p.m., on Wednesday evening, March 26, at the Hotel Somerset. He will discuss "The International Position of the United States and What to Do About It." Dr. James W. Manary, superintendent and medical director of the Boston City Hospital, will preside.

Other speakers on the program are Dr. Leonard Carmichael, president of Tufts College, who will report on the developments to date of the fund-raising campaign, Dr. Frank R. Ober, who will tell of the Medical Alumni Council's reorganization, and His Honor, Mayor Maurice J. Tobin, who will bring the greetings of the city of Boston.

The dinner will also serve as a special reunion for members of the 1916 class, celebrating their silver anniversary. Simultaneously, the Rhode Island Tufts Medical Club will combine the activities of its annual meeting with this dinner. Dr. Harmon P. B. Jordan, superintendent of the Providence Lying-In Hospital, and Dr. Charles F. Gormly, physician-in-chief of the Rhode Island Hospital, Providence, head the Rhode Island delegation.

ROBERT DAWSON EVANS MEMORIAL LECTURE

Dr. Allen O. Whipple, professor of surgery at Columbia University College of Physicians and Surgeons, will give the third in a series of four Robert Dawson Evans Memorial lectures on Friday, March 28, at 8:15 p.m., in the Evans Auditorium, 78 East Concord Street, Boston. His subject will be "A Discussion of Certain Splenopathies in Relation to the Vascular Bed of the Spleen."

Physicians and medical students are cordially invited to attend.

CONSULTATION CLINICS FOR CRIPPLED CHILDREN IN MASSACHUSETTS, UNDER THE PROVISIONS OF THE SOCIAL SECURITY ACT

CLINIC	DATE	CLINIC CONSULTANT
Salem	April 7	Harold C. Bean
Gardner	April 8	Mark H. Rogers
Haverhill	April 9	William T. Green
Brockton	April 10	George W. Van Gorder
Lowell	April 11	Albert H. Brewster
Northampton	April 16	Garry deN. Hough, Jr.
Worcester	April 18	John W. O'Meara
Pittsfield	April 21	Frank A. Slowick
Hyannis	April 22	Paul L. Norton
Fall River	April 28	Eugene A. McCarthy

MASSACHUSETTS PSYCHIATRIC SOCIETY

The next meeting of the Massachusetts Psychiatric Society will be held at the Massachusetts General Hospital on Friday, March 28, at 8 p.m.

PROGRAM

The Anticonvulsive Action of Neoprontosil. Drs. Stanley Cobb and Mandel E. Cohen.

The Conditional Salivary Reflex in Psychoneurotic Patients. Drs. Jacob E. Finesinger and George F. Sutherland.

The Evaluation of Changes in Mental Status Produced under Laboratory Condition. Dr. Erich Lindemann.

Studies in Muscular Tension in the Neuroses. Dr. Jurgen Ruesch.

NEW ENGLAND SOCIETY OF PSYCHIATRY

The annual meeting of the New England Society of Psychiatry will be held at the Fairfield State Hospital, Newtown, Connecticut, on Thursday, April 10. Dr. Arthur H. Ruggles, superintendent of the Butler Hospital, Providence, Rhode Island, will speak on the subject "Work Therapy: Its importance to the patient and to the hospital."

HERMANN M. BIGGS MEMORIAL LECTURE

The Hermann M. Biggs Memorial Lecture, given under the auspices of the Committee on Public Health Relations of the New York Academy of Medicine, will be delivered by Dr. C. A. Mills, professor of experimental medicine, University of Cincinnati, at The New York Academy of Medicine, on Thursday, April 3, at 8:30 p.m. Dr. Mills will speak on "The Relation of Climate and Geography to Health."

The medical profession and the public are cordially invited to attend.

NEW ENGLAND HEALTH INSTITUTE

The New England Health Institute will be held in Boston on Wednesday, Thursday and Friday, April 2–4. All lectures will be at the Hotel Statler. The Wednesday evening session will be devoted to talks on public health in its relation to national-defense measures. Dr. Paul J. Jakmauh, Commissioner of Public Health in Massachusetts, will preside at this meeting, at which Dr. Thomas Parran, Surgeon General, U. S. Public Health Service, and Miss Katherine Lenroot, Chief, Children's Bureau, U. S. Department of Labor, will be the speakers. On Thursday evening a dinner and dance will be held at the Hotel Statler. Brigadier General Frederick F. Russell, of the

U. S. Army Medical Reserve Corps, will be the speaker at the dinner.

The three-day institute is divided into sixteen sections, covering every field of health work. Four sessions will run concurrently every hour from 9:30 a.m. to 12:30 p.m., and from 2:00 p.m. to 5:00 p.m. The various sections and chairmen are as follows:

Sections	Chairmen
Public-Health Administration	Travis P. Burroughs, M.D., Stanley H. Osborn, M.D.
Cancer and Chronic Diseases	Ludvig Hektoen, M.D., Sc.D.
Communicable Diseases	Roscoe L. Mitchell, M.D., Charles F. Dalton, M.D., Lester A. Round, Ph.D.
Crippled Children	Robert C. Hood, M.D.
Environmental Sanitation	Arthur D. Weston, C.E.
Food and Drugs	Harry E. Barnard, Ph.D.
Genitoinfectious Diseases	Raymond A. Vonderlehr, M.D.
Health Education	Ira V. Hiscock, Sc.D.
Laboratory	Friend Lee Mickle, Sc.D.
Maternal and Child Hygiene	Martha M. Eliot, M.D., Francis V. Corrigan, M.D.
Nutrition	Helen Hinman, S.B.
Occupational Hygiene	Philip Drinker, S.B., Ch.E.
Public-Health Nursing	Pearl McIver, R.N. Hazel V. Dudley, R.N.
School Health	Walter F. Downey, M.Ed.
Tuberculosis	Henry D. Chadwick, M.D.
Vital Statistics	Thomas J. Duffield

Those desiring detailed information should apply to the Massachusetts Department of Public Health, State House, Boston.

THE FOUNDATION PRIZE

The American Association of Obstetricians, Gynecologists and Abdominal Surgeons announces that the annual Foundation Prize for this year will be $150. Those eligible include only interns, residents or graduate students in obstetrics, gynecology or abdominal surgery and physicians who are actively practicing or teaching obstetrics, gynecology or abdominal surgery.

Competing manuscripts must be presented in triplicate under a nom de plume to the secretary of the association before June 1, be limited to 5000 words and such illustrations as are necessary for a clear exposition of the thesis and be typewritten (double-spaced) on one side of the sheet, with ample margins.

The successful thesis must be presented at the next annual meeting of the association, without expense to the association and in conformity with its regulations.

For further details, address Dr. James R. Bloss, *Secretary*, 418 Eleventh Street, Huntington, West Virginia.

SOCIETY MEETINGS AND CONFERENCES

Calendar of Boston District for the Week Beginning Sunday, March 23

Monday, March 24

*11:30 a.m. Carney Hospital. Monthly clinical meeting and luncheon.

12:15–1:15 p.m. Clinicopathological conference. Peter Bent Brigham Hospital amphitheater.

*8:15 p.m. New England Heart Association. Boston City Hospital, pathological amphitheater.

*8:15 p.m. The Role of Art in the Development of the Natural Sciences in the Renaissance. Professor J. Walter Wilson. Boston Medical History Club. Boston Medical Library, 8 Fenway.

Tuesday, March 25

*9–10 a.m. Handwriting in Neurology and Psychiatry. Dr. J. C. G. Loring. Joseph H. Pratt Diagnostic Hospital.

12:15–1:15 p.m. Clinicoroentgenologic conference. Peter Bent Brigham Hospital amphitheater.

5 p.m. Massachusetts General Hospital. Hospital Research Council. Ether Dome.

Wednesday, March 26

*9–10 a.m. Hospital case presentation. Dr. S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

*12 m. Clinicopathological conference. Children's Hospital.

7 p.m. Tufts College Medical School Alumni Association. Hotel Somerset, Boston.

Thursday, March 27

*8:30 a.m. Combined clinic of the medical, surgical, orthopedic and pediatric services of the Children's Hospital and the Peter Bent Brigham Hospital, at the Peter Bent Brigham Hospital.

*9–10 a.m. Syringomyelia. Dr. H. H. Merritt. Joseph H. Pratt Diagnostic Hospital.

12:30 p.m. Community Nursing Council of Boston. Perkins Hall, Women's Educational and Industrial Union, 264 Boylston Street, Boston.

Friday, March 28

*9–10 a.m. Some of the Medical Aspects of the Care of Patients with Rheumatic Fever and Rheumatic Heart Disease. Dr. T. D. Jones. Joseph H. Pratt Diagnostic Hospital.

8 p.m. Massachusetts Psychiatric Society. Massachusetts General Hospital.

*8:15 p.m. A Discussion of Certain Splenopathies in Relation to the Vascular Bed of the Spleen. Dr. Allen O. Whipple. Robert Dawson Evans Memorial Lecture. Evans Auditorium, 78 East Concord Street, Boston.

Saturday, March 29

*9–10 a.m. Hospital case presentation. Dr. S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

*Open to the medical profession.

March 30 — Free public lecture. Quincy City Hospital. Page 436, issue of March 6.

March 31–April 4 — Sixth Annual Postgraduate Institute of the Philadelphia County Medical Society. Page 349, issue of February 20.

April 2–4 — New England Health Institute. Page 531.

April 3 — Hermann M. Biggs Memorial Lecture. Page 531.

April 10 — New England Society of Psychiatry. Page 531.

April 10 — Pentucket Association of Physicians. Page 263, issue of August 15.

April 21–25 — American College of Physicians. Page 1065, issue of June 20.

April 28–30 — American Academy of Physical Medicine. Scientific session. Hotel Pennsylvania, New York City.

May 5–9 — American Association of Industrial Physicians and Surgeons and American Industrial Hygiene Association. Page 484, issue of March 13.

May 21, 22 — Massachusetts Medical Society, Boston.

May 28–June 2 — American Board of Obstetrics and Gynecology. Page 262, issue of February 6.

June 2–6 — American Medical Association. Cleveland, Ohio.

October 14–17 — American Public Health Association. Page 135, issue of January 16.

District Medical Societies

ESSEX SOUTH

April 2 — Pediatric Problems in General Practice. Dr. Joseph Garland. Addison Gilbert Hospital, Gloucester.

May 14 — Relation of the Doctor to the Law. Mr. Leland Powers. New Ocean House, Swampscott.

FRANKLIN

May 13 — This meeting will be held at 11 a.m. at the Franklin County Hospital, Greenfield.

NORFOLK

March 25 — Page 484, issue of March 13.

May 8 — Censors' meeting. Hotel Puritan.

SUFFOLK

April 30 — Page 604, issue of October 10.

May 1 — Censors' meeting. Page 261, issue of February 6.

WORCESTER

April 9 — Hahnemann Hospital, Worcester.

Supper at 6:30 p.m. followed by a business meeting and scientific program.